AMERICAN
MANAGEMENT
SYSTEMS, INC.

Workload Analysis

(Draft)

for the

Bureau of Land Management

ADP Modernization Project

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Contract AA852-CT5-15

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MANAGEMENT SUMMARY

This document contains a preliminary analysis of BLM's future automated data processing (ADP) and telecommunications workload and a preliminary assessment of the Bureau's current ADP and telecommunications systems' ability to provide the capacity needed in the future to meet BLM's user requirements for automated support.

The initial phase of the ADP Modernization Project is a strategic planning effort -- its purpose is to define the best overall ADP and telecommunications architecture for the Bureau. This analysis is the third task in the Modernization Project. It combines the findings of the functional requirements analysis (compiled in Task 1) with BLM's existing ADP and telecommunications capabilities and current workload (identified in Task 2) to project future workload and to assess whether current resources can meet future demand and functional requirements. As the last task in Phase I of the Modernization Project - the Needs Assessment, this task lays the groundwork for Phase II - Concept Development.

The findings presented here are based on: interviews with a large number of BLM staff located in field offices, Headquarters, and the Denver Service Center; reviews of current applications including documentation, and other materials supplied by BLM; analysis of system-generated workload statistics; and discussions with hardware and software vendors.

The approach for developing a projection of future ADP and telecommunications workload was to start with the 67 functions, identified in Task 1, which BLM staff perform in carrying out the Bureau's mission. For each function we assessed the likely future growth in workload (numbers of improvements, cases, burros, etc.). We then identified the existing automated applications supporting the functions and the ADP and telecommunications workload associated with each as well as any additional automated capabilities needed to support the function in the future. Although the objective was to use this method to develop a quantitative projection of future ADP and telecommunications workload, which could then be compared against the capacity of the Bureau's current systems, we encountered several situations which caused us to modify our approach.

- Very few "hard" statistics are available on current ADP and telecommunications usage and workload. Some system-generated statistics are available for the Honeywell DPS-8/70 in DSC (which accounts for roughly 20% of BLM's current computer capacity) but few are available for outside systems and data is only beginning to be available for the State Office Level 6 minicomputers. This makes it impossible, at this time, to develop an accurate, quantitative workload baseline, a projection of the workload associated with existing applications, or an accurate assessment of the available capacity of the current systems.

- Growth in BLM's ADP and telecommunications workload appears to be driven by expansion of existing ADP applications and by development of new applications to support BLM's operations rather than by programmatic growth. While ADP and telecommunications usage has been growing and can be expected to continue to grow, most of BLM's functional workload (numbers of cases, etc.) is expected to grow at a relatively low rate. Thus, a reasonable accurate timetable for the introduction of additional automation within the Bureau is essential in order to develop an accurate projection of capacity requirements.

- Many of the factors likely to have a major impact on BLM's future ADP and telecommunications workload (e.g., the final scope and timing of GIS and ALMRS and the plans for Department-wide applications) are just now being finalized. This complicates the development of accurate forecasts of future ADP and telecommunications capacity requirements.

Thus, at this point we are able to analyze and project future functional workload and to make a preliminary, qualitative assessment of the ability of BLM's current systems to meet future needs. We will complete the the projection of ADP and telecommunications workload and

the assessment of BLM's current systems when additional usage statistics are available for the current systems and the plans for ALMRS and GIS are firm. The key conclusions at this time are:

- Telecommunications will play an increasingly important role in linking the over 140 BLM locations. Telecommunications usage has been expanding much faster than program growth and a flexible, reliable network is a key requirement for meeting the Bureau's future needs. The distributed nature of BLM's operations and the increasing need to share information among locations dictate the need for an effective communications network.

- Computing and data storage capacity beyond what is available with the current systems will be needed to meet future needs. BLM's current ADP systems will not be able to support the systems development and growth anticipated by BLM over the next ten years. Even without the loads represented by ALMRS and GIS, little additional capacity apeears to be available on the current systems to meet the other needs of BLM's users for additional automated capabilities or to handle normal growth.

- Options are available which may allow BLM to extend the useful life of the current systems without significant investment if there is no major systems development activity. Without additional usage data, AMS cannot precisely project current system life. However, it may be possible to add additional data storage capacity to the DPS 8/70 and to improve the reliability of the telecommunications network linking the Level 6s and the DPS 8/70 without a major investment.

Thus, our preliminary conclusion is that the Bureau's current ADP and telecommunications systems do not have sufficient capacity to meet future needs. As we proceed with the Modernization Study we will collect additional

usage statistics for the current systems. Once this data is available and the plans for ALMRS and GIS are finalized, we will complete the workload projection and assessment of the current systems and extensively revise and expand this document.

1. INTRODUCTION

1.1 Objectives of this Analysis

This document, the third major deliverable produced under American Management Systems' contract to support the Bureau of Land Management's ADP Modernization Study, documents the results of an analysis of the Bureau's future automated data processing (ADP) and telecommunications workload and the preliminary assessment of BLM's current ADP and telecommunications systems' ability to meet future workload and functional requirements. The objective of this analysis is to develop a quantitative projection of the Bureau's future ADP and telecommunications workload and to combine the findings of the functional requirements analysis (compiled in Task 1) with BLM's existing ADP and telecommunications capabilities and current and future workload to assess whether current resources can adaquately support BLM in the future. As the last task in Phase I of the ADP Modernization Study - the Needs Assessment, this task lays the groundwork for Phase II - Concept Development, where the architecture and plan for the next generation of BLM's ADP and telecommunications systems will be developed.

The Bureau's automated data processing requirements are currently supported by a network of computers located primarily in BLM's Denver Service Center (DSC) and State Offices. BLM also uses computers owned by other organizations -- such as the U.S. Geological Survey, the Bureau of Reclamation, the Forest Service, and the Bonneville Power Administration -- to support specific applications and on a timesharing basis.

To ensure that the ADP and telecommunications resources needed to meet the Bureau's future requirements are available, BLM has initiated the ADP Modernization Project. This project is intended to accomplish the following objectives:

- Define BLM's current and future functional requirements for ADP and data communications support.

- Document the capabilities of BLM's current hardware and software and analyze any deficiencies in meeting current and future requirements.

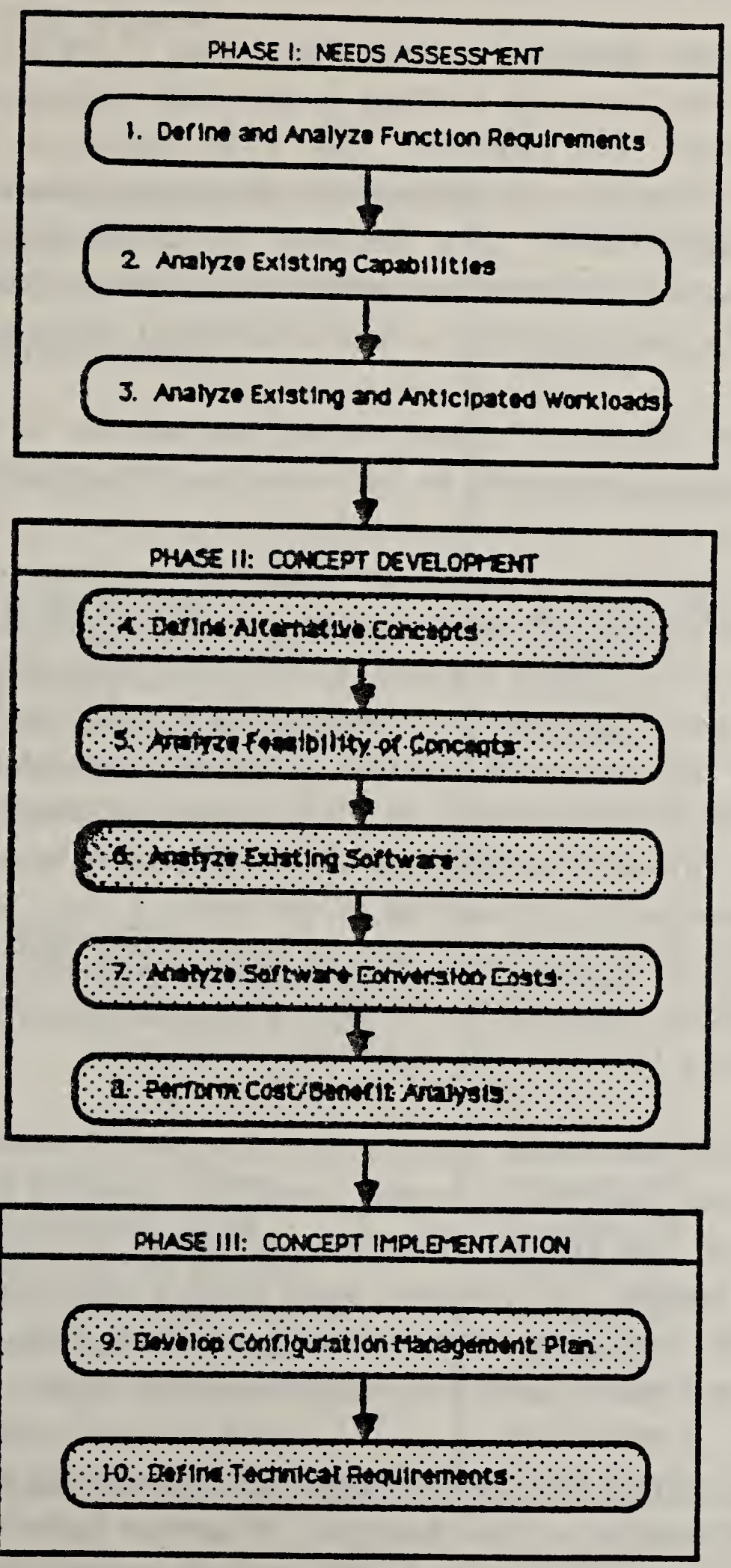
- Identify the most efficient and cost-effective ADP hardware, software, and data communications configuration based on a cost/benefit analysis of alternative concepts.

- Prepare a configuration management plan with which to control the acquisition and management of any needed hardware, software, and communications capabilities.

- Specify the technical requirements for any new ADP technology that BLM may elect to procure.

Figure 1-1 depicts the tasks to be performed under AMS' contract. AMS' work is scheduled to be completed by the end of fiscal 1987. At this time, drafts of the analysis of BLM's functional requirements and the analysis of existing capabilities have been delivered.

Figure 1-1. AMS has begun work on all three Needs Assessment Tasks.



1.2 Methodology, Limitations, and Assumptions

Workload analysis is the third task of the BLM ADP Modernization Project and the final task of Phase 1, the Needs Assessment. The objectives of this analysis are twofold. The first objective is to develop a quantitative projection of BLM's future ADP and telecommunications workload. The second objective of this analysis is to assess the ability of BLM's current ADP and telecommunications systems to adaquately process the projected workload and to meet the Bureau's future functional requirements.

Future ADP and telecommunications workload and technical requirements will be dictated by the needs of BLM's mission. The first step in developing projections of future ADP workload and requirements was to develop projections of functional workload, i.e., the workload, such as cases, directly associated with the performance of BLM's mission. The functional workload projections presented in this document are derived from interviews with BLM staff, review of manuals and other materials supplied by BLM, and analysis of statistics collected by BLM's current systems. After completing Washington Office interviews, AMS visited a number of field offices to interview field personnel and collect relevant documentation. These offices were selected by BLM to provide a reasonable cross-section of the Bureau's field operations. Project team members visited the Denver Service Center (DSC), four State Offices, six District Offices, and eight Resource Area Offices during September and October. Figure 1-2 lists the field offices visited.

During the field visits, we collected information on the functions being performed and the expected growth or change in functions as well as information on the systems in current use and any available data on usage of the current systems. In addition, phone surveys were made to those State and field offices that were not visited. During these calls, we obtained information on ADP facilities and estimated system usage.

The current ADP and telecommunications workload was discussed in the previous deliverable - the Analysis of Current Capabilities. The initial approach for projecting future ADP and telecommunications workload was to estimate the ADP and telecommunications workload generated by the functional

Figure 1-2. AMS visited a variety of BLM field offices in preparing this analysis.

BLM FIELD OFFICE	DATES OF VISIT
Denver Service Center	October 7-11
Eastern States Office	September 26-27
Montana State Office	October 7-8 and 11
Miles City District Office	October 9
Big Dry Resource Area	October 9
Powder River Resource Area	October 9
Lewistown District Office	October 10
Judith Resource Area	October 10
Colorado State Office	October 15-16
Grand Junction District Office	October 17-18
Grand Junction Resource Area	October 17-18
Oregon State Office	October 28-29
Medford District Office	October 30
Medford Resource Area	October 30
Lakeview District Office	October 31
Klamath Falls Resource Area	October 31
Prineville District Office	November 1
Central Oregon Resource Area	November 1
Deschutes Resource Area	November 1

workload by using the current workload as a baseline. This requires the availability of detailed workload statistics for current applications. Although some statistics are available, additional data must be collected before an accurate projection can be made. In addition, two of the largest potential sources of workload are ALMRS and GIS. Developing a projection of ADP and telecommunications workload for BLM as a whole requires relatively firm projections of workload for both these applications. Thus, at this point, only qualitative observations can be made concerning BLM's future ADP and telecommunications workload. An accurate, quantitative projection can be made when additional statistics are available for the current systems and the plans and projections for ALMRS and GIS are finalized.

Functional requirements were also translated into technical capability requirements by comparing BLM's functional requirements (as described in the Requirements Analysis) with the ADP capabilities commonly used by government and industry to support similar activities.

To complete the analysis we compared the projected workload and other requirements with the capabilities of BLM's current ADP and telecommunications systems to assess the suitability of those systems for the future. Since only limited quantitative workload data is available, we are not able, at this time, to make precise projections of the current systems' ability to handle the future workload. Again, we can only make qualitative observations. When additional workload data for the current systems is available and the plans for ALMRS and GIS are finalized, a thorough assessment of the current systems will be completed.

This document does not consider office automation requirements. BLM has contracts in place to meet its needs for word processing equipment and microcomputers. While we address the interface between ADP and office automation, the Modernization Project (and this workload analysis) does not address requirements for office automation support.

The major assumption underlying this analysis is that the BLM field offices we visited are representative of BLM. BLM selected these field offices as representative of BLM's programs and operations. Based on our

visits, the diversity in BLM from field office to field office is high. We are assuming, however, that the sites we have visited are representative and that they provide a sufficient sample for analyzing the major issues we are addressing in the Modernization Project.

1.3 Organization of this Document

In addition to this introduction, this document is divided into five chapters and two appendices:

- **Chapter 2, Overview.** Chapter 2 summarizes the results of the workload analysis, the assessment of current systems ability to support BLM's future workload and functional requirements, and the implications of these findings for subsequent tasks of the ADP modernization Project.

- **Chapter 3, Workload Analysis by Functional Area.** Chapter 3 discusses the characteristics and anticipated growth in the functional (or programmatic) workload associated with each of BLM's functional areas - Energy and Mineral Resources, Lands and Renewable Resources, and Management Services. In addition to discussing workload characteristics common to all three functional areas, Chapter 3 describes the unique workload characteristics for each as well as the ADP and telecommunications workload implications of the functional workload.

- **Chapter 4, Local Office Workload Characteristics.** Chapter 4 summarizes the characteristics of the workload found at each of BLM's major types of field offices -- State Office, District Office, and Resource Area Office. The purpose of Chapter 4 is to provide a geographic perspective of BLM's workload to complement the functional perspective presented in Chapter 3.

- **Chapter 5, Telecommunications Workload.** Chapter 5 discusses the projected telecommunications network workload in BLM.

- **Chapter 6, Meeting Requirements with Existing Capabilities.** Chapter 6 discusses the ability of BLM's current systems to meet future functional and workload requirements as well as

some possible short-term incremental upgrades and improvements which provide increased capacity and capabilities.

- **Appendix A, B.** Appendix A contains a matrix matching BLM's functional requirements to the ADP applications currently supporting the requirements. Appendix B provides descriptions of some current Honeywell products which are representative of the type of products which could be used to provide short-term upgrades to BLM's ADP systems.

2. OVERVIEW

Although quantitative measures are not available, BLM's current ADP and telecommunications systems appear to be inadequate to support BLM's future level of activity, particularly large scale systems development efforts. Even without major systems development, BLM appears to be outgrowing current capabilities based on the expansion in the number of system users, and growing functional demand for ADP support. Expansion of current systems is limited - some State Office Level 6 systems cannot be upgraded further. However, the data needed to estimate when currently available capacity will be exhausted is not yet available.

This chapter summarizes the findings of our analysis of BLM's future ADP and telecommunications workload and the ability of BLM's current systems to continue to provide adequate ADP support. This chapter also summarizes the implications of these findings for BLM and for future tasks in the ADP Modernization Study.

2.1 Key Findings and Observations

Based on BLM staff interviews, current systems documentation, and other materials supplied by BLM, AMS made the following findings and observations:

- Very few "hard" computer system utilization statistics are available on current ADP and telecommunications capabilities.

- The timing and scope of major anticipated application systems development and software sharing are undetermined.

- ADP growth in BLM is not driven by program growth.

- User perceptions are dampening demand for BLM's current ADP and telecommunications systems.

These observations have significant impact on both BLM and the ADP Modernization Study.

2.1.1 Very Few "Hard" Utilization Statistics are Available.

As shown in Figure 2-1, few "hard" statistics are available for BLM's current ADP and telecommunications workload. Detailed workload projections must be based on historical workload data for CPU utilization, input/output (I/O) activity, disk usage, tape usage, print usage, and telecommunications network usage. Data should be collected by location and should show distribution between batch and on-line processing, and normal and peak usage. Ideally, workload figures are collected over a three year time period in order to reveal trends or cyclical variations such as seasonal peaks.

Using the currently available statistics would be misleading as:

- **Computer generated statistics were available only for the Honeywell DPS-8/70 and the DSC Level 6 system.** The DPS 8/70 processor accounts for only 20% of BLM's total processing capability. The DSC Level 6 is not a production system and therefore not representative of State Office workloads.

- **Little information exists for State workloads.** No data was available. Also, there is no typical State, which prohibits extrapolation of functional workload from one State for another.

- **Statistics are not available for the BLM workload processed on ADP systems outside of BLM.** Twenty percent of the identified applications supporting BLM functions use non-BLM ADP services.

This workload data must be available for BLM to adequately size the capacity required by each location.

Figure 2-1 Few "hard" utilization statistics are currently available for BLM's Systems

	SOURCE OF DATA				
SYSTEM	CPU	DISK	TAPE	PRINT	COMMUNICATIONS
Honeywell DPS 8/70	SARA-H, Charge-Back Sys.	SARA-H, Charge-Back Sys.	Charge-Back System	Charge-Back System	FEDSIM Report
Honeywell Level 6's					
DSC	CPE	CPE	None	None	None
State Offices	Interviews	None	None	None	None
Data General Systems	Interviews	None	None	None	None
Hewlett-Packard Systems	Interviews	None	None	None	None
Burroughs B-4800	Utilization Reports	None	None	None	None
Burroughs B-2700	Utilization Reports	None	None	None	None

2.1.2 The Timing and Scope of Software Development Efforts are Undetermined.

Anticipating capacity requirements for BLM is difficult. BLM is likely to experience dramatic shifts in its ADP application base in the next ten years. Several major events concerning ADP applications are likely to occur during this period including major systems development and software sharing with other bureaus. The scope and timing of these events are undetermined. If they occur, capability requirements could range from several times BLM's current systems capability to comparable or slightly less capability than current systems.

At least two major systems development projects are underway, ALMRS and GIS. Both systems will handle large volumes of data in remote locations, including graphics data. BLM has not given final approval to the scope, complexity, and timing of these two efforts. If these systems development efforts proceed, they will have significant impact on data storage, processing equipment capability, software and telecommunications requirements. The timing and phasing of these applications will be key factors in capacity planning.

The impact of ALMRS alone illustrates how timing and scope can effect capacity plans. We compared the limited workload data available to the data used in the ALMRS functional requirements. The ALMRS team used projections based on a compounded growth rate of 3.5%. Our sample of disk and CPU utilization at DSC indicated an approximate growth rate of 12% per year. We graphed a range of projected growth for DSC applications and ALMRS on the same axis based on these growth rates for disk space, CPU MIPS, and graphics terminals. As shown in Figures 2-2, 2-3, and 2-4, ALMRS, as currently defined, will clearly increase ADP capacity requirements by several times the figures projected for DSC. There are no estimates currently available for GIS. If there were, the range of resources required would be even wider.

The risk of planning error also increases proportionally with the size of the requirements. A 10% projection error for current DSC applications requirements in 1997 represents approximately 23 CPU MIPS or 2.4 gigabytes of

Figure 2-2 ALMRS projects almost ten times the storage DSC alone would need

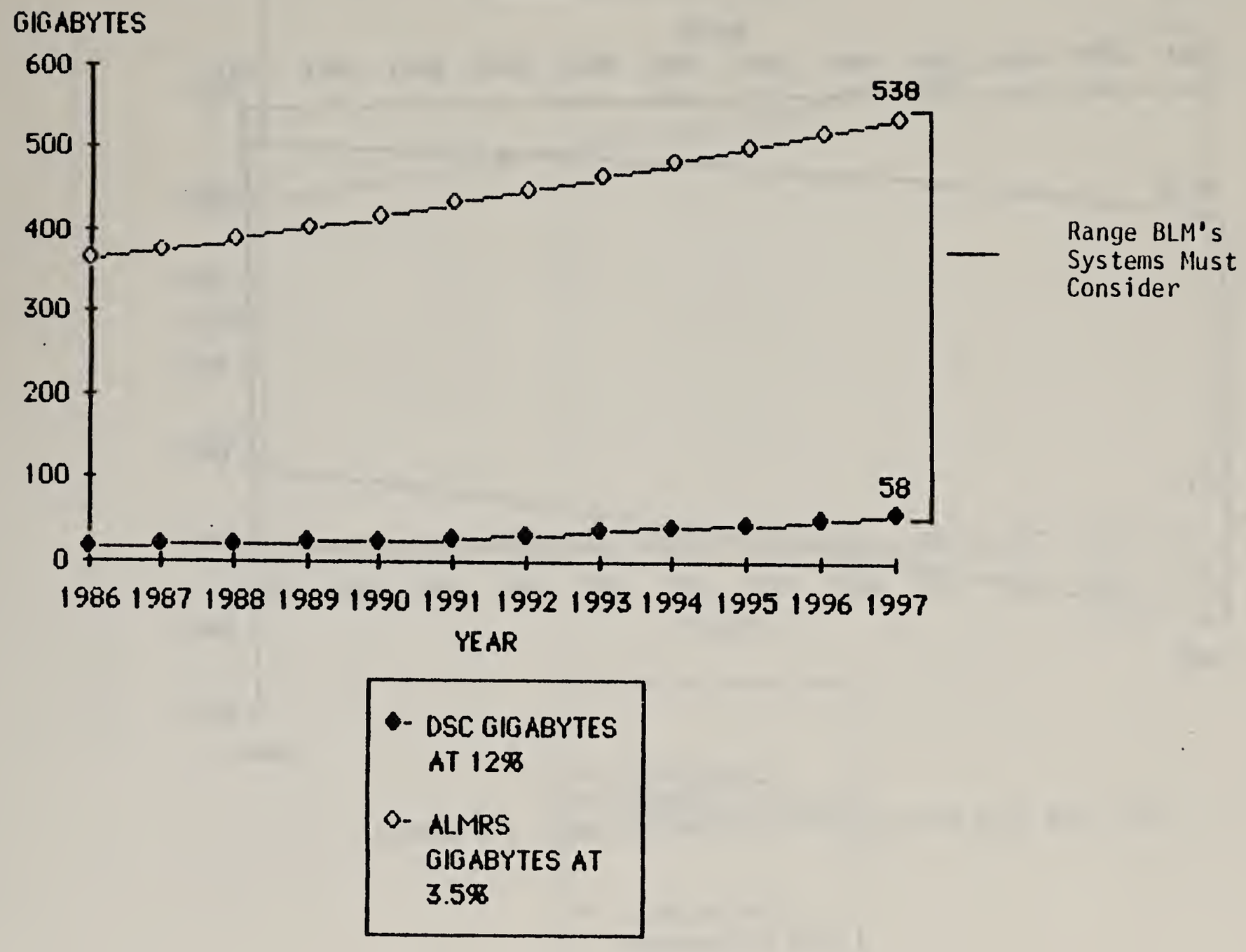


Figure 2-3 ALMRS projects four times the MIPS DSC alone would need

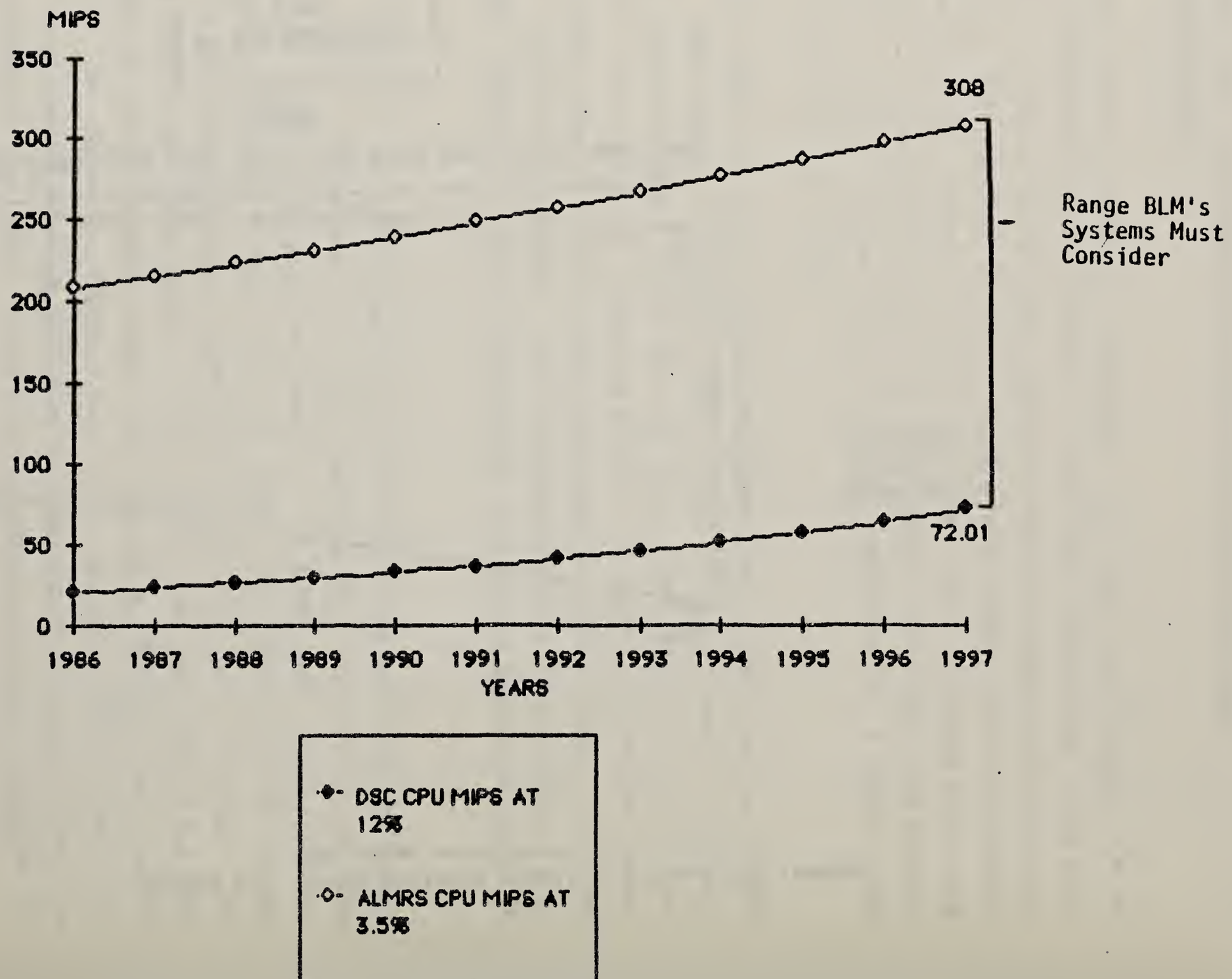


Figure 2-4 ALMRS projects almost 30 times the number of graphic terminals as DSC

disk storage. A 10% projection error for ALMRS represents 31 CPU MIPS or 54 gigabytes of disk storage. Accurate projections and planning become much more important for larger capacity requirements.

In addition to planned new systems development, there are several initiatives within the Department of Interior to share software among the bureaus. These could radically increase or decrease BLM's ADP capacity requirements as one of the systems being considered, the Financial Management System, is responsible for approximately one-third of DSC's current processing. DOI has directed that one bureau will be designated by DOI as a lead bureau to provide ADP services for the other bureaus for a particular administrative system. DOI may designate different bureaus as lead bureau on different systems. Four such areas were indicated during our interviews: Payroll, Procurement, Property Management, and Financial Management. BLM is a candidate for all but Payroll. If DOI does not designate BLM as the lead bureau for any of these efforts and the current applications under development are not approved, BLM would require approximately one-third less ADP capacity for DSC applications than is already installed at DSC. Conversely, if BLM is designated as a lead bureau the same policy could result in a dramatic workload increase.

2.1.3 ADP Growth in BLM is Not Driven by Program Growth

Although ADP usage is increasing, (as indicated by the utilization data obtained sample from DSC), staff interviews showed most of BLM's programs are stable with little or no anticipated growth. Systems growth seems to be driven by improved ADP support for existing operations, through either the implementation of new systems or the improvement of existing systems, not by expanding program responsibilities. This characteristic gives BLM the advantage of being able to plan more effectively than an agency whose programs and responsibilities are in constant flux.

2.1.4 User Perceptions are Dampening Demand for BLM's Systems

BLM's systems might be more extensively used if the users perceived the system as easy-to-use, reliable, and well supported. Our interviews

indicate this is not the users' perception of the current systems. As a result, systems have been developed on outside services which duplicate the capability available internally. Field staff have reported reverting to manual techniques rather than rely on the system. Users have complained about inadequate training, lack of user documentation, incompatible technology, and frustration with data entry techniques.

When systems are not meeting user needs, users find alternative means of solving their problems: manual systems, outside ADP services, and duplicate software development. BLM is experiencing all of these symptoms.

2.2 The Ability of Current Systems to Support Future Workload

The ability of BLM's systems to meet future workload should be considered for both near-term (2 years) and long-term (10 years). We discuss these considerations from two perspectives: hardware/software and telecommunications.

2.2.1 Long-term

If the large projects proposed in current plans are implemented, BLM will require:

- A broader hardware and software base for data storage, data processing, and providing access to data. ALMRS alone projects a data base many times the size of any BLM has handled in the past. BLM will also require more software tools for end-users to reduce the level of expertise necessary for systems development and use.

- More reliable telecommunications. Telecommunications failures which are only an inconvenience now could become a major systems problem with the volume of data proposed.

Current systems appear to be inadequate to meet long-term needs if major systems are developed as planned, as they are likely to be outgrown even without major systems development. Although no statistics are available, several states are at maximum CPU capacity for their Level 6's with no further upgrades available. Without further upgrades to the hardware and improved telecommunications, many BLM locations could not add the software capabilities required to support users in the future.

2.2.2 Near-term

If no major systems are developed, BLM could improve user support and continue using existing equipment with some incremental improvements for a limited period of time, although with the data currently available it is not

possible to assess exactly how long. During our interviews with BLM staff, certain system problems recurred in the discussions or seemed to underly many of the user complaints. By taking steps to develop interim solutions to these concerns, BLM can improve support with only minimal investment. We recommend BLM consider the following near-term steps:

- Improve availability of disk storage "little links"
- Improve telecommunication line reliability
- Reduce turnaround time for data entry and error reporting
- Provide end user tools
- Collect hardware and telecommunications workload measurement data

Although current systems appear to be inadequate for the long-term needs of BLM, BLM may be able to use existing contract vehicles and minimal investment to meet some of the near-term needs:

- Hardware and software.

  To improve system support, BLM should add additional software products such as those listed in Appendix B for systems measurement, end user support, and application generation. However, according to Honeywell, only one product listed is available on the Level 6, Pro-IV - an application generator. All of them will operate under Honeywell's latest operating system, GCOS 8. Seven will operate under GCOS III as well which the DPS 8/70 at DSC runs.

  Many of Honeywell's latest products are designed for the DPS 6, which is Honeywell's replacement for the Level 6. The DPS 6 is a 32-bit processor. The Level 6 is a 16-bit processor. Most of the software designed for the DPS 6 will not run on the Level 6.

To run additional systems on the Level 6s, the State Offices will use more internal memory. This may require a memory upgrade. However, some States have no further upgrades available. Without utilization statistics it is impossible to determine if there are other ways available to increase the systems' memory utilization and stretch their capabilities than to install a DPS 6.

- Telecommunications

It appears that BLM could improve their network capability under existing contracts by upgrading the current Frontend Network Processors to Datanet 8 telecommunications processors and installing Honeywell's improved communications software in DSC and the State Offices. The new software, DSA (and DSA 6 for the Level 6), requires more CPU memory than the current communications software but provides automatic rerouting and 'pass through' capability that can improve network reliability and ease-of-use.

To improve redundancy in the near-term, BLM could possibly lay additional telecommunications lines at the State Office level or patch into the GEONET Value Added Network (VAN) operated by USGS. BLM uses GEONET now to a limited degree to access some outside systems, although its current pricing strategy does not make it attractive. To expand its use of GEONET BLM might consider: (1)adding DSA which complies with the Tymnet X.25 standard used by GEONET and makes more extensive use feasible and (2) sharing GEONET with other colocated agencies to reduce costs. GEONET could supply reliability in compliance with normal business standards for at least part of the BLM network.

Further discussions and a cost/benefit analysis must be conducted to determine costs, timing, and the degree of reliability BLM can afford before the feasibility of these opportunities can be assessed.

2.3 Implications for BLM and the ADP Modernization Study

The ability or inability of BLM's systems and telecommunications capabilities to meet future needs has certain implications for both BLM and the ADP Modernization Study. Based on these assessments, BLM must take certain steps to assure adequate ADP support in the future. The ADP Modernization Study must also adjust to the implications of these assessments.

The most important implication for the BLM is that more utilization data must be collected to support the planning process. Inadequate data is available now. Historical data is required to properly project trends and plan. BLM should begin collecting this data immediately.

The results of this first phase have implications for the subsequent tasks of the ADP Modernization Study:

- **Flexibility must be a key component of BLM's ADP strategy.** In addition to insufficient measurement data, BLM faces: an uncertain future for ADP applications; user demand which appears to be dampened by current hard-to-use systems and other support problems; and, the same activity performed at different office levels. The architecture chosen must have the flexibility to expand with increased demand and provide compatibility between offices with varying sizes of workload.

- **Reliable telecommunications must be a key element of any BLM strategy.** Due to the widespread nature of the organization and the extensive need to share data between offices at different levels, telecommunications will be even more important in supporting BLM's day-to-day activities than now.

3. FUNCTIONAL WORKLOAD ANALYSIS

The objective of the ADP Modernization Project is to select the architecture of ADP hardware, software, and telecommunications which will best meet BLM's future functional and workload needs. These needs are dictated by the functions BLM performs in carrying out its mission. In the Functional Requirements task of the Modernization Study AMS identified 67 functions the BLM staff perform to fulfill the Bureau's mission. These functions were grouped into three areas: Energy and Minerals, Lands and Renewable Resources, and Management Services. This chapter discusses the future workload associated with these functions and a preliminary assessment of the technical requirements needed to support them. Development of projections of ADP workload associated with these functions will be completed when additional utilization statistics are available for the current systems and the plans for ALMRS and GIS have been finalized.

The analysis of the functional workload includes distribution throughout the BLM organization, growth patterns, applications and hardware which now support the functions, and the key automated capabilities needed to support the functions in the future.

3.1 Overall Observations

The following observations apply to all of BLM's functions:

- **The rate of programmatic growth for BLM functions is expected to be low over the next 10 years.** While some functions such as Waste Management, Recreation, and Culture will experience dramatic growth they constitute a small part of the overall workload and will have little impact on overall programmatic growth.

- **No overall cyclical peaks were evident in BLM functional processing workloads.** While some functions such as grazing and land improvements require heavier support in the summer, this is not generally the case in BLM. Energy and Minerals functions show no significant signs of peak processing. Other functions such as financial applications in Management Services have monthly or quarterly processing cycles. The net effect is a relatively level processing workload.

- **Functional workload commonly occurs at more than one office.** In some instances the actual work is shared with each office doing a part of the task; sometimes the same function is done at two or more organizational levels; in other instances data is created in one office and transmitted to another to be used. For example the Case Processing functional workload is shared by State, District, and Resource Areas, with each performing different phases of case processing. Districts and Resource Areas share in the development of RMPs. Land improvements are done at the Resource Area Offices and summary data for the function is transmitted to the State and Washington offices. States and Districts which border one another need to exchange information on their borderland. Chapter 4 addresses the distribution of workload and requirements among BLM's offices.

- **Growth in BLM's ADP and telecommunications workload will be driven by expansion of existing ADP applications and by development of new applications more than by programmatic growth.** Meeting the functional requirements of BLM programs will require significant ADP application development. For example, both resource programs depend heavily on land coordinate and characteristics data. The development of automated applications to provide this data will result in a large increase in ADP and telecommunications workload.

- **Additional information is needed to estimate the ADP and telecommunications workload associated with the functional workload.** Developing accurate projections of ADP workload requires additional workload statistics for the current systems as well as finalization of the requirements and plans for ALMRS and GIS. Additional workload statistics for the current systems, such as processing loads on the Level 6 computers and telecommunications traffic, are needed to develop projections of the workload associated with the current applications and the workload associated with future applications which are similar to current applications. Since ALMRS and GIS constitute major potential sources of ADP and telecommunications workload and address many of BLM's functions, plans for these two applications must be finalized before accurate, aggregate projections of workload and other requirements can be made.

- **A common set of automated capabilities are required to support BLM's functions.** Based on field staff interviews and experience with similar functions in other agencies, AMS has compiled an initial list of the automated capabilities needed to support BLM functions. These capabilities, listed in Figure 3-1, represent the generic types of automation which will improve the ability of the BLM staff to perform their functions. This list of capabilities will be used in subsequent tasks of the Modernization Project to derive the technical requirements for the hardware, system software, and communications networks BLM will need to meet its functional requirements. As the ALMRS and GIS plans are finalized and BLM priorities with regard to these capabilities are established, this list will be refined.

The remainder of this chapter addresses the workload and other requirements associated with Energy and Minerals, Lands and Renewable Resources, and Management Services. This includes mapping the automated capabilities list against the functions they would support in each area.

Figure 3-1: Preliminary List of Automated Capabilities Required to Support BLM Functions

- Tracking Systems (cases, etc.)
- Management Reporting Systems
- Text Retrieval
- Text Processing
- Communications (bulletin board, electronic mail, etc.)
- Ad Hoc Inquiry and Reporting
- On-line Data Collection
- Overlays/Graphics (GIS)
- Access to Outside Systems (USGS, Forest Service, etc.)
- Analytical Systems (Statistics, Modeling, Engineering, etc.)
- Electronic Spreadsheets
- Business Graphics

3.2 Projected Energy and Minerals Workload and Requirements

This section describes the program workload for Energy and Mineral (E&M): where the data is collected and used; current ADP application and telecommunications workload; projections of anticipated growth; and the automated capabilities and tools required by E&M to meet their functional needs.

3.2.1 Functional Workload and User Distribution

Energy and Minerals functions are performed almost exclusively at the State and District office level. As shown in Figure 3-2, Characteristics of Energy and Minerals Functions, about 50% of the E&M functions occur at the State and District offices, with an additional 20% at the State Office alone. About 10% of the functions are performed at the Washington office. No function for E&M resides exclusively at the Resource Area and only about 15% of the functions in E&M involve Resource Area staff.

The raw data for Energy and Minerals is collected and utilized primarily at the State and District levels. Data analysis is done at both levels. The volume of program workload varies considerably among the States. For example, Figure 3-3 shows that Wyoming has a large oil and gas program workload, while others like Oregon have a low oil and gas workload.

3.2.2 Current Applications and Telecommunications Support

Approximately two thirds of the applications supporting Energy and Mineral Resources run on the DPS-8 at DSC and are accessed through the BLM telecommunications network. The remainder run on outside systems. As shown in Appendix A, BLM Functions and Applications, AMS identified 22 functions within E&M. Approximately 60% of these functions are currently supported by ADP applications. Of the applications identified only Case Recordation is processed on the Level 6s.

E&M relies heavily on telecommunications for transmission to DSC and Outside systems. Since the State and District offices both collect the data

FIGURE 3-2. CHARACTERISTICS OF ENERGY AND MINERALS FUNCTIONS

	Office Dist.	Peak Processing	Current ADP Support	Program Growth	ANTICIPATED PROGRAM INCREASE IN: Data Collection	Reporting Requirements
Energy and Minerals						
Competitive Oil & Gas Leasing	S/D	*	None	-	-	-
Over-the-Counter Oil & Gas Leasing	S	*	None	-	-	-
Simultaneous Oil and Gas Leasing	S	Bi-Mo	DSC	-	-	-
Maintain Oil and Gas Lease Files	S/D/R	*	None	-	-	-
Id. & Invest. Drainage Situations	W/D/S	*	Non-DSC	M	-	-
Id. & Delineate (KGSs)	S/D	*	Non-DSC	-	-	-
Proc. Unit & Other Agreement Appl.	S/D	*	None	-	-	-
Oil & Gas Insp. & Enforcement	S/D/R	*	DSC	L	-	-
Reg. Act. Planning-Coal Leasing	S	*	None	L	-	-
Coal Leasing	S	*	None	-	-	-
Pref. Right Leas./Non-Energy. Min.	S/D	*	Non-DSC	-	-	-
Leasing-Non-Energy Minerals	S/D	*	None	-	-	-
Maintain Solid Min. Lease & Mine Files	S/D	*	Non-DSC	-	-	L
Solid Leasable Minerals Reg. Req.	S/D	*	Non-DSC	-	-	L
Solid Leasable Minerals Insp. & Enf.	S/D	*	Non-DSC	-	-	L
Mining Claims	S	FY/Oct	DSC	-	-	-
Salable Minerals	S/D	*	Non-DSC	-	-	-
Adjudicate Energy and Mineral Leases	S	*	DSC	-	-	-
Administer Waste Management Service	S/D	*	None	H	H	H
Coordinate with Minerals Mgmt. Sv.	S/D	*	DSC	-	-	L
Support BLM Resource Mgmt. Planning	S/D/R	*	None	-	-	-
Policy, Procedures, Mgmt. for E & M	W	*	DSC	-	-	-

* = NO PERCEIVED PEAK - = NONE ANTICIPATED H = HIGH M = MEDIUM L = LOW

W/S/D/R = WASHINGTON OFFICE, STATE OFFICE, DISTRICT OFFICE, RESOURCE AREA

Figure 3-3. Workload in Energy and Minerals programs varies by State.

State Office	Leases Issued	Acreage Leased
Alaska	---	---
Arizona	33	59,664
California	97	79,025
Colorado	806	1,378,810
Eastern States	184	96,993
Idaho	31	46,558
Montana	1,000	1,199,989
Nevada	166	446,038
New Mexico	423	546,332
Oregon	48	102,597
Utah	379	583,924
Wyoming	1,128	917,013
TOTAL	4,295	5,456,943

Source: Public Land Statistics 1984

Note: All data for fiscal 1984.

and use the results, raw data is currently transmitted to DSC, processed, and transferred back to the State and District offices to be used.

3.2.3 Anticipated Growth

Low growth is anticipated for Energy and Minerals programs. E&M programs are not expected to grow, with the exception of the Waste Management program which is new and very unpredictable. E&M program activity may surge or decline periodically due to fluctuations in energy fuel prices but these programs do not anticipate significant long-term growth.

ADP systems growth may occur as new systems are developed or current systems enhanced. For example BLM may develop applications to support the E&M functions not currently automated; or applications now running on outside systems might be brought under the BLM automation umbrella.

3.2.4 Automated Capabilities Applicable to E&M

We analyzed the functions of Energy and Minerals to identify the key automated capabilities most useful in supporting these functions. Figure 3-4 shows the capabilities needed to support E&M functions. Some of these capabilities, such as project tracking and the ability to generate management reports, are applicable to almost every E&M function. Others, such as business graphics and analytical modeling software, were isolated to a few specific functions. On-line data collection is a capability which is needed to support most of the E&M functions.

E&M functions require analytical software capabilities, such as statistical software and engineering, to a greater extent than indicated in either L&RR or MS. About 70% of the E&M functions could use analytical software capabilities compared to 20% of the L&RR functions.

Figure 3-4 Energy and Minerals requires management reports, tracking and queries to support its automation needs.

Energy and Minerals Functional Requirements	Automated Capabilities: Tracking	Management Reports	Communications	Text Retrieval	Text Processing	Query	On-line Data Entry	Overlays/Graphics (GIS)	Outside Systems	Analyt'l Software (Stats,Eng.Etc.)	Spreadsheets	Business Graphics
Competitive Oil and Gas Leasing	●	●	●	●	●	●	●	●		●		
Over-the-Counter Oil and Gas Leasing	●	●	●	●	●	●	●	●		●		
Simultaneous Oil and Gas Leasing	●	●	●	●	●	●	●	●		●		
Maintain Oil and Gas Lease Files	●	●	●			●	●	●				
Identify and Investigate Drainage Situations	●	●				●	●	●		●		
Identify and Delineate Known Geological Structures (KGSs)	●	●	●	●		●	●	●	●	●		
Process Unit and Other Agreement Applications	●	●	●	●		●				●		
Oil and Gas Inspection and Enforcement	●	●				●	●					
Regional Activity Planning for Coal Leasing	●	●				●	●	●				
Coal Leasing	●	●				●	●	●		●	●	●
Preference Right Leases for Non-Energy Minerals	●	●				●	●			●		
Competitive Leasing for Non-Energy Leasable Minerals, Tar Sands, and Oil Shale	●	●				●	●			●	●	
Maintain Solid Minerals Lease and Mine Files	●	●				●	●			●		
Solid Leasable Minerals Regulatory Requirements	●	●				●				●		
Solid Leasable Minerals Inspection and Enforcement	●	●	●	●		●	●					
Mining Claims	●	●				●	●			●		
Salable Minerals	●	●				●	●			●		
Adjudicate Energy and Mineral Leases	●	●	●	●	●	●	●			●		
Administer Waste Management Service	●	●				●						●
Coordinate with Mineral Management Service	●	●	●			●			●	●	●	
Support BLM Resource Management Planning								●		●	●	
Provide Policy, Procedures, and Overall Program Management for Energy and Mineral Resources Functions	●	●				●				●		●

3.3 Lands and Renewable Resources Projected Workload

This section describes the program workload for Lands and Renewable Resources (L&RR), where the data is collected and used; current ADP application and telecommunications workload; projections of anticipated growth; and the automated capabilities required by L&RR to meet their functional needs.

3.3.1 Functional Workload and User Distribution

Lands and Renewable Resources workload appears to be heavily concentrated at the District and Resource Area offices. As shown in Figure 3-5, Characteristics of BLM Functions, about 80% of the functions occur in the District and Resource Areas and about 20% in the State or Washington offices. Though this suggests that technical capability to support L&RR reside at the Districts and Resource Areas, functionality does not necessarily correspond to workload. The workload for one function could dwarf that of another. Accurate workload figures will have to be collected to size the ADP and telecommunications capability required.

Raw data for the L&RR functions is generated and used primarily at the Resource Area and District levels. Some functions such as socio-economic modeling occur at the State level and are used by Districts and Resource Areas. Data is stored primarily at DSC.

The volume of program workload varies considerably among the States. As Figure 3-6 shows, the Eastern State Office has no workload in grazing functions. Montana has the largest number of operators, and Nevada the most acres and largest revenue collection.

3.3.2 Current Applications and Telecommunications Support

Lands and Renewable Resources depends upon the DSC and the telecommunications network for over half of their automated processing. As shown in Appendix A, BLM Functions and Applications, AMS identified 26 applications which support the L&RR functions. About 90% of these functions are supported by ADP applications. Over half of these applications run on the BLM Honeywell Network.

FIGURE 3-5. CHARACTERISTICS OF LANDS AND RENEWABLE RESOURCES FUNCTIONS

	Office Dist.	Peak Processing	Current ADP Support	Program Growth	ANTICIPATED PROGRAM INCREASE IN: Data Collection	Reporting Requirements
Lands and Renewable Resources						
Track R&D Projects	W/S/D/R	FY	Non-DSC	-	-	-
Planning Guidance	W/S/D/R	*	None	-	L	L
Land Management Oversight	W	*	DSC	-	-	-
Land Records Maintenance	S/D	Daily	None	-	-	-
Process Land Cases	S/D/R	Fall	DSC	-	-	-
Planning	D/R	*	DSC	-	-	-
Grazing Permit and Billing	R	Spring	DSC	-	-	-
Rangeland Monitoring	S/D/R	Summer	DSC	-	-	-
Public Land Improvement	D/R	Summer	DSC	M	-	-
Inventory	D/R	*	DSC	M	-	-
Forest Appraisal	D/R	*	Non-DSC	-	-	-
Timber Sales	D/R	Summer	DSC	-	-	-
Wild Horses and Burros	W/S/D/R	Summer	DSC	-	M	-
Wildlife Habitat Protection	D/R	Summer	DSC	-	L	-
Recreation Management	D/R	*	Non-DSC	-	H	-
Cultural Resource Management	D/R	Summer	Non-DSC	-	H	-
Research and Studies	W/S/D/R	*	Non-DSC	-	H	-

* = NO PERCEIVED PEAK - = NONE ANTICIPATED H = HIGH M = MEDIUM L = LOW

W/S/D/R = WASHINGTON OFFICE, STATE OFFICE, DISTRICT OFFICE, RESOURCE AREA

Figure 3-6. Workload for Land and Renewable Resources functions varies by State.

Grazing permits in force on grazing district (sec 3.) lands
as of September 30, 1984 (Permits)

State	Operators	Acres	AUM's	Revenue Collected
Arizona	490	10,170374	489,865	$ 698,055
California	277	5,069,612	349,114	155,651
Colorado	1,337	7,543,923	671,811	581,691
Idaho	2,045	14,949,197	1,931,715	1,533,475
Montana	2,790	6,245,441	1,029,200	992,618
Nebraska	2	2,442	259	0
Nevada	687	47,381,464	2,861,671	2,585,083
New Mexico	1,729	11,435,450	1,706,844	1,695,088
Oregon	787	13,492,741	1,065,890	1,232,799
Utah	1,870	22,614,454	1,450,207	1,375,035
Wyoming	1,039	17,963,321	2,071,697	1,546,609
Total	13,053	156,868,419	13,583,273	$12,396,104

Source: Range Management Automated System, Bureau of Land Management - Public Land Statistics - 1984

L&RR relies heavily on telecommunications for transmission to DSC and to Outside systems. Data is transmitted to DSC for data entry, processed and returned to the field offices. Thirty-four percent of L&RR applications are run on Outside systems.

3.3.3 Anticipated Growth

Low programmatic growth is anticipated for Lands and Renewable Resources functions. While two programs are expected to grow over the next 10 years, (40% for Recreation and 50% for Culture), both are small relative to the entire programmatic workload. Based on the number of Land cases processed, Recreation represents 15% of the total number of BLM cases; Cultural cases constitute about 1% of the whole. Since Recreation and Culture employ approximately 180 people out of a total BLM staff of approximately 10,000, the impact will be relatively small. The Wild Horses and Burros program will peak in 1986 and diminish over the next three years, which will balance some of the growth in Recreation and Culture.

ADP growth may occur over the next ten years as new systems are developed or current systems enhanced. The Lands and Renewable Resources staff in the field expressed an enormous interest for land coordinate data and thematic overlays. The implications of applications development to support such capability are discussed in Chapter 2.

3.3.4 Automated Capabilities Applicable to Lands and Renewable Resources

As Figure 3-7 shows, there is a substantial need for automated capabilities for L&RR functions. The capabilities most applicable to L&RR functions are improved management reporting, ad hoc inquiry and reporting, and on-line data collection. There is an additional need for project or case tracking, modeling and access to outside systems.

The L&RR functions currently rely on outside system support more than E&M or MS functions and have a higher percentage of functions than E&M that could use business graphics support.

Figure 3-7 Lands and Renewable Resources needs management reporting, queries, and on-line data entry capabilities to support its automation requirements.

Lands and Renewable Resources Functional Requirements	Tracking	Management Reports	Communications	Text Retrieval	Text Processing	Query	On-line Data Entry	Overlays/Graphics (GIS)	Outside Systems	Analyt'l Software (Stats,Eng.Etc.)	Spreadsheets	Business Graphics
Track R&D Projects	●	●	●	●	●							●
Planning Guidance	●	●	●	●	●					●		●
Land Management Oversight	●	●	●			●						●
Land Records Maintenance				●		●	●					
Process Land Cases		●	●			●	●	●				●
Planning					●	●	●	●	●	●		
Grazing Permit and Billing		●	●			●	●					
Rangeland Monitoring	●	●				●	●		●			
Public Land Improvement	●	●	●			●						●
Inventory		●	●			●			●			
Forest Appraisal		●				●	●		●	●		
Timber Sales		●	●			●	●		●	●		
Wild Horses and Burros	●	●				●	●				●	
Wildlife Habitat Protection	●	●				●		●				
Recreation Management	●	●					●			●	●	
Cultural Resource Management		●	●	●	●	●	●	●	●			
Research and Studies	●	●	●		●	●		●	●	●	●	

3.4 Management Services Workload Analysis

This section describes the program workload for Management Services (MS); where the data is collected and used; current ADP application and telecommunications workload; projections of anticipated growth; and the automated capabilities required by MS to meet their functional needs.

3.4.1 Functional Workload and User Distribution

Management Services workload resides primarily in the State and Washington offices. As shown in Figure 3-8 about 35% of the MS functions occur in State offices, 30% in Washington, 20% in the Districts, 15% in DSC and none in the Resource Areas. Of the 28 functions eight represent functions performed by the Washington, State and District offices; four are performed in Washington exclusively; four are performed by the Washington and State and four are processed by State and District offices. Since functions occur at several office levels, telecommunications should be available to allow them all access to applications and data.

Raw data for Management Services is collected at all levels of the organization and utilized primarily at the State, DSC and Washington offices. The data entry workload potential exists at all levels. Data is stored primarily at DSC, indicating the need for a reliable, transparent telecommunications network.

The size of the workload varies by State and application. As Figure 3-9 shows, the personnel applications workload is heavy in Oregon which has a staff of over 1,500, and lighter in the Eastern States Office.

3.4.2 Current Applications and Telecommunications Support

The 28 Management Services functions are currently supported by 51 applications but 28% of the functions have no automated support. Management Services depends upon DSC and the telecommunications network for over half of their automated functions. The remaining applications run on the Data General (2), Wang (3), or outside systems (8). This implies that although MS

FIGURE 3-8. CHARACTERISTICS OF MANAGEMENT SERVICES FUNCTIONS

Management Services	Office Dist.	Peak Processing	Current ADP Support	ANTICIPATED PROGRAM INCREASE IN: Program Growth	Data Collection	Reporting Requirements
Safety Inspection and Reporting	W	Qtly	Non-DSC	-	-	-
Personnel and Payroll Management	W/S/D	*	DSC	L	-	L
Position Management	W/S	Monthly	DSC	L	-	L
Training	W/S	Seasonal	Non-DSC	-	M	-
Contract Preparation and Control	W/S/D	Monthly	DSC	M	L	-
Fleet, Per. Prop., & Facility Mgmt.	S/D	*	DSC	-	L	-
Information Systems Management	W/DSC	Annual	None	-	L	-
Telecommun. & Technology Mgmt.	W	*	None	-	L	-
Records Management	W/S/D	*	Non-DSC	-	-	-
Organ. Analysis & Reform 88 Rpt.	W	*	DSC	-	-	-
Program Evaluation	S	Monthly	None	-	-	-
Fin. Handling of Accounts	W/DSC/S	Monthly	DSC	M	-	-
Financial Reporting	W	Monthly	DSC	M	-	-
Incident Investigation and Reporting	W/S	Annually	Non-DSC	-	-	L
Plan/Conduct Cadastral Surveys	S/DSC	Qtly	DSC	-	-	-
Maintain Cadastral Field Notes	S/DSC	Winter	DSC	-	-	-
Track Cadastral Surveys-Outside Agencies	S	Monthly	DSC	-	-	-
Cartoraphic Services - GIS	S	Seasonal	DSC	-	-	-
Facility Construction & Maintenance	D/S/DSC	Summer	DSC	-	-	-
Transportation System Maintenance	S/D	Seasonal	DSC	-	M	-
Prevent, Predict & Fight Wildfire	S/D	*	DSC	L	-	-
Coordinate Aviation Requirements	S	Seasonal	Non-DSC	-	-	-
Equal Employ. Opport. Compliance Rpt.	W/S/D	Monthly	DSC	-	-	L
Equal Employ. Opport. Conflict Resol.	W/S/D	Monthly	DSC	-	-	L
Budget Development	W/S	*	DSC	-	-	-
Budget Operations	W/S/D	Monthly	DSC	-	-	-
External Liaison Queries	W/S/D	*	None	-	L	-
External Liaison Doc./Material Prep.	W/S/D	*	None	-	L	-

* = NO PERCEIVED PEAK - = NONE ANTICIPATED H = HIGH M = MEDIUM L = LOW

W/S/D/R = WASHINGTON OFFICE, STATE OFFICE, DISTRICT OFFICE, RESOURCE AREA

Figure 3-9. Management Services workload varies by State, such as the heavy personnel workload in Oregon.

	Number of Employees	Temporary/ Seasonals	Estimated Number of Employee Actions
Washington Office	461	25	1,022
Denver Service Center	529	---	1,058
Alaska	819	300	2,838
Arizona	400	40	960
BIFC	150	40	460
California	613	180	1,946
Colorado	684	140	1,928
Idaho	451	280	2,022
Montana	572	175	1,844
Nevada	509	250	2,018
New Mexico	730	70	1,740
Oregon	1,474	300	4,148
Utah	555	100	1,510
Wyoming	723	200	2,246
Eastern States	214	10	468
TOTAL	8,884	2,110	26,208

Source: WO-830 Employment Branch, does not include political appointees or Executive Service

relies heavily on the BLM Honeywell Network, it also uses a variety of other hardware for automation support.

3.4.3 Anticipated Growth

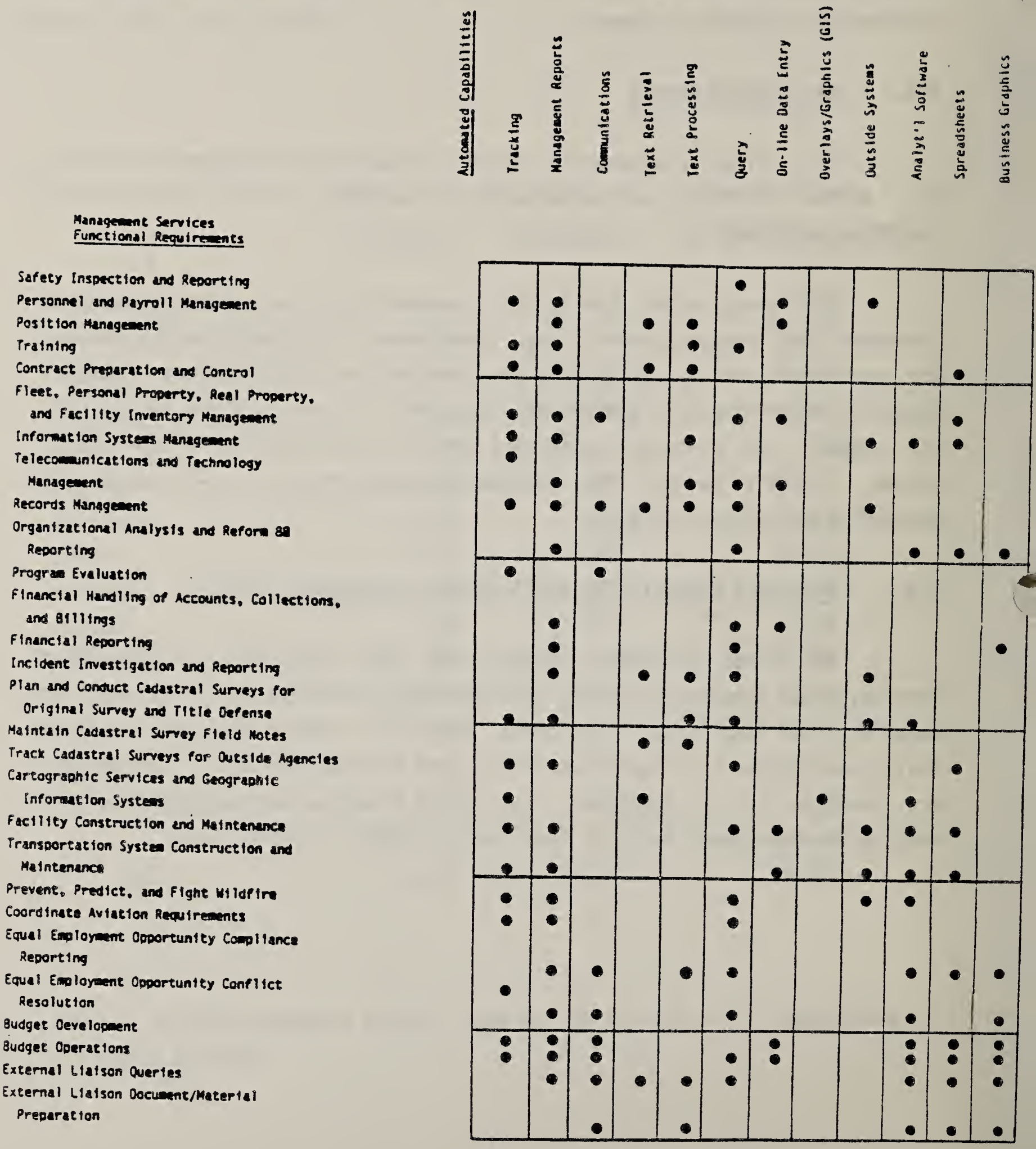
Only slight programmatic growth is expected for Management Services. Only a few functions, such as cartographic services and training, anticipate increased workload.

ADP growth within BLM for MS is unpredictable even though demand for increased ADP support seems strong. Some areas of ADP in BLM will grow over the next ten years as new systems are developed or current systems enhanced. However, Department-wide systems may reduce MS reliance on BLM's ADP systems. For example, the Financial Management area is a candidate for a Departmental system. BLM's current FMS represents approximately one-third of the processing on the DSC DPS-8/70.

3.4.4 Automated Capabilities Applicable to Management Services

The three automated capabilities most applicable to Management Services are: management reports (23 functions), tracking (19 functions), and modeling (13 functions). Thirteen functions require text processing and analytical systems to support statistical and engineering needs. Spreadsheets are required by 12 functions. All of the 12 automated capabilities can be used by the Management Services functions as shown in Figure 3-10.

Figure 3-10. Management Services requires management reports, tracking and query capabilities to support its automation requirements.



4. LOCAL OFFICE WORKLOAD CHARACTERISTICS

When evaluating alternative configurations of ADP hardware and telecommunications networks for BLM, a key factor in the analysis will be the geographic distribution of workload and functional requirements among BLM's various locations. This chapter contains an analysis of the workload and functional needs of BLM's offices.

BLM's approximately 10,000 employees are located in over 220 separate locations including the Washington Office, the Denver Service Center, 12 State Offices, 55 District Offices, and 153 Resource Area Offices. While workload and functional requirements are determined by BLM's programs, work is carried out in the field offices, Washington and DSC.

The Washington Office maintains a staff of about 500 people who perform policy, procedures, guidance, program oversight and field office review functions. Washington generates policy and guidance material for the States and receives program summary information from the States.

The Denver Service Cénter operates BLM's central computer center, is the primary ADP development center, provides centralized expertise in engineering and other technical activities, and performs administrative processing functions. DSC operates with a staff slightly over 500 people.

The Boise Interagency Fire Center (BIFC) is an independent office of 150 people reporting to the Administrative Division. It is responsible for fire program coordination.

The State Offices operate with a great deal of autonomy and there is a significant difference between States in the programs they administer. State organizations and the functions distributed among the District and Resource Area offices vary accordingly. For example, Colorado delegates surveying to the District Offices because it is a large program in Colorado while some other States run surveys out of the State Office. State offices vary from a staff of over 1,500 to just over 200.

State Offices have a large workload for administrative and land management operational functions. For example procurement is typically a State Office administrative function and case tracking and program tracking are typical State Office operational functions. States also perform functions which can be more efficiently done in a single facility, such as providing library research and modeling studies for the Districts and Resource Areas.

District Offices are the middle men at BLM, serving both State and Resource Area offices. They are frequently colocated with Resource Area Offices. District Offices vary in size. Those AMS visited varied from as few as 30 people to over 60. The workload varies according to the size of the staff and land managed.

District Offices perform administrative and land management operational functions with an emphasis on the operational functions. Examples of administrative work done in some District Offices are managing procurements, fire programs, and engineering. Districts with significant energy and mineral resources provide operational functions usually done at the State level. Districts also summarize data gathered in the Resource Areas and pass it on to the State Office.

Resource Areas are the ground level of BLM operations. They perform the day to day resource management of BLM lands. Resource Areas visited varied from a staff of seven to over 30. Once again the workload depends upon the size of the staff and the characteristics of land managed. Resource Areas can be colocated with a District Office, or located in a remote area by themselves.

The key characteristics of the future ADP workload and functional requirements in BLM's local offices are as follows.

- **The distribution of workload and functional requirements among the types of field offices varies from State to State depending on the distribution of responsibilities and relative program emphasis.** Due to differences in programs and in size and local program emphasis, and a flexible field

office structure, the workload for each State varies. For example, the oil and gas program in Colorado carries a larger workload than in Oregon. Also, BLM's flexible field office structure allows States to delegate work differently. For example, Oregon delegates procurement to the District Offices for purchases up to $25,000, a policy not followed in other States. The future BLM ADP and telecommunications architecture should provide the flexibility to meet the unique requirements of each State and adapt to the wide range of sizes and program emphasis in local offices.

- **In some cases, different offices perform the same functions or tasks within a function using the same data or use the same data but for different functions.** For example, State, District and Resource Area offices all work on the case processing function and all use the same application (ORCA) for that work. On the other hand, the soil conservationists, range managers and hydrologists all use information on soil conditions of a specific location but use different applications to process that information. Data sharing frequently occurs between States which share borders and require information on the same land. The largest amount of shared use is generally between organizational levels next to each other in the hierarchy, such as the States sharing functions or data with Washington and the Districts. This finding implies that the ADP and telecommunications architecture must support the sharing of common data and capabilities among separate locations.

- **All the automated capabilities needed to meet BLM's functional requirements are needed at all BLM locations.** Although detailed functions vary between offices, all offices will require access to the same automated capabilities since the functions requiring those capabilities can occur at all locations. The type of access provided may depend on the level of function activity in a particular office.

- **Field office workload does not show any dramatic operational peaks or valleys.** Although Resource Areas perform most of their work out in the field in the spring, summer, and fall, the short respite in winter does not represent a dramatic slump in workload for them. State and District offices workload is a year round process, with normal but not dramatic peaks and valleys.

- **Field offices show a large variation in use and development of ADP.** For instance in the District Office at Grand Junction, Colorado, a bonafide computer support group is being formed, but this appears to be unusual. Some States such as California developed and support about 30 applications, while the average number of State developed applications appears to be about five.

- **Few statistics on current use of ADP resources by field offices are available.** While some workload statistics are available for local office use of the DPS-8, statistics are just beginning to be collected for the Level 6s and little data is available for the other mini computers in the field offices. This workload represents roughly half of BLM's total workload. While not necessarily needed for the ADP Modernization Project, relatively precise estimates of workload for each local office will be needed in order to accurately configure any new systems to be installed in these offices.

5. TELECOMMUNICATIONS WORKLOAD ANALYSIS

Telecommunications plays an important role in linking the over 140 BLM locations. As BLM implements more systems to support field office users and users become more reliant on them, telecommunications will take on even more importance. Because of the key role of telecommunications in BLM, we have included this discussion of the nature of the telecommunications workload in BLM and its growth.

5.1 Summary Analysis and Key Observations

In studying the existing telecommunications capabilities in BLM and attempting to project future workload requirements, AMS made the following observations:

- **The requirements for telecommunications are growing at a pace much faster than program growth.** Some state offices report expanding from less than ten terminals to over fifty in just two years. Microcomputers are also proliferating. Most of the microcomputers and all of the terminals require telecommunications links to the State Offices and DSC. In addition, development and installation of new applications such as ALMRS and GIS will result in major increases in the need for telecommunications support.

- **The current demand for telecommunications may be higher than current usage figures would indicate.** As detailed in the functional requirements, BLM field staff have experienced difficulty in using the current BLM telecommunications network to the extent that some users have reduced their use of the network. For example, most Resource Areas must establish three separate links (RA to DO; DO to SO; and SO to DSC) to communicate to DSC. Also, if any single physical line is disrupted, the user is cut-off, no automatic rerouting is available. Thus, if the ease of use and reliability of the existing network are improved, usage may increase without the development of additional applications.

- Of the three measures of telecommunications workload (network nodes, transmission volumes, and number of concurrent users) only one factor, the network nodes, can be accurately defined today. In order to specify the requirements for telecommunications, all three factors should be specified. Although software is now installed which will collect some communications traffic statistics, our understanding is that statistics for current communications traffic are not available. The only data made available to us was a five-day sample of traffic between State Offices and DSC. Likewise we were unable to locate data on the number of concurrent users of the current communications network. While the number of terminals in each location could be used to approximate the relative geographic distribution of communications users but would not be an accurate measure of concurrent usage. Since the number and locations of BLM facilities are relatively stable, the number and locations of network nodes can be predicted fairly accurately.

- Too many factors are still unknown for us to make a reasonable projection of telecommunications workload. In addition to the lack of data on current numbers of users and transmission volumes, the scope and timing of major changes to the application software base (e.g., systems development for ALMRS, the possibility of a Department FMS supplied by another bureau, etc.) are only now being determined. These factors will have significant impact on telecommunications workload volume and distribution. Thus we will develop the projections for communications workload when additional data is available for the current network and the scope and timing of major applications efforts have been finalized.

5.2 Future Telecommunications Workload

The workload measures required to configure a telecommunications network is expressed in terms of:

-- **Network nodes (number and locations).** The identification of network nodes facilitates the sizing of the network by defining the physical locations which must be serviced by the network.

-- **Transmission volumes.** The number of characters transmitted per unit of time between (from/to) the nodes of the network dictate the capacity of the network.

-- **Number(s) of concurrent users.** The number of concurrent users dictates the number of teleprocessing ports, lines, modems, and front end processors.

Since the BLM locations served by the network will not change significantly, we can identify network nodes served by the current network and those to be served in the future. We can estimate the relative geographic distribution of current workload by compiling the number of terminals and microcomputers available in a location but this does not give a measure of traffic or concurrent usage. We cannot project either concurrent usage or transmission volumes.

Some limited telecommunications traffic data is available from a five-day sample of transmissions between DSC and the State Offices. Although this data indicated that DSC transmitted to the State Offices approximately four times the number of characters per day that it received, the sample size is too small to draw any conclusions or use as a base for workload projections.

The impact of the timing and scope of systems development activities such as ALMRS and of software sharing initiatives with other bureaus also make a reliable projection of telecommunications transmission volumes difficult.

Timing and implementation strategy will also have significant impact on both transmission volume and workload distribution.

Although we cannot project exact growth, we can identify trends in telecommunications usage. The number of terminals within BLM is growing quickly as users become more familiar with ADP possible applications but the distribution is uneven. The number of terminals for a specific State Office varies from 132 terminals in the Wyoming State Office to 57 in the Montana State Office. A total of over 1000 terminals were recorded in the State Office and DSC equipment inventories. With the number of terminals growing quickly, the number of concurrent users on the system is also likely to increase, increasing communications workload.

A key requirement of BLM's telecommunications network will be flexibility to easily adjust to changes in workload dynamics since the workload is likely to increase but neither its volume nor geographic distribution can be accurately predicted at this time. The network will need sufficient flexibility to accommodate a wide range of possible workload levels over the next ten years.

By beginning to collect statistics on current communications traffic, BLM can develop a baseline measure of telecommunications workload. As the plans for the development of future applications are finalized future workload can be predicted more precisely.

6. USING EXISTING CAPABILITIES TO MEET ADP DEMAND

6.1 Long-term Viability of Current BLM Systems

We cannot project precisely how long BLM may be able to extend the life of the current systems. There are several factors which suggest that the BLM will soon outgrow the current systems but key characteristics of these factors remain undefined. Since several State Offices have no remaining memory upgrades available for the Level 6s and ADP demand appears to be rising, it is likely that these States will reach capacity soon. However, there are few utilization statistics available to indicate how close to capacity these CPU's are now or how quickly their workload will bring them to capacity.

Current systems do not appear adequate to support BLM's current large scale systems development plans. The projections of current large scale development projects propose many times the amount of data, users, and communications traffic than that supported by current systems. While it is clear this volume alone would overwhelm current capabilities, the exact scope and timing of these efforts is undetermined.

Until current utilization can be measured in more detail and the timing and scope of future development is finalized, the expected life of current systems cannot be projected with confidence.

6.2 Near-term Opportunities to Improve BLM Systems

While current BLM ADP systems will not be able to support the systems development and growth anticipated by BLM within the next ten years, BLM may be able to extend the useful life of the current systems without significant investment. This section discusses some of those opportunities.

There is evidence that the systems outside the Honeywell network, such as the Data General GIS systems, are not currently meeting user demand. For example, Data General terminals to access GIS are in short supply in some

states, as illustrated by the requests Fire managers have received to use the Data General equipment dedicated to IAMS for GIS in the off-season. The Medford District Office has a month long sign-up sheet for use of Hewlitt-Packard graphics equipment used for drafting. However, because these systems are relatively independent, the related opportunities tend to be more localized in nature than the Honeywell network opportunities. Because the Honeywell network serves all of BLM, the focus of this discussion is on opportunities to upgrade these systems.

Short term hardware and software improvements can be realized through two sources: upgrading current capability under existing contract vehicles, or awarding sole-source contracts or GSA schedule awards for low dollar value system improvements.

We have addressed two categories of potential improvements: ADP hardware/software and telecommunications.

6.2.1 ADP Hardware and Software

The main opportunities to enhance the capabilities of the Honeywell hardware and software are to:

- Make additional disk storage "little links" available.
- Provide additional end-user "tools".
- Collect additional resource utilization data.

Appendix B lists the Honeywell products currently available which could be used to implement some of these improvements along with an indication of the systems software required and whether they are available on the GSA schedule.

6.2.1.1 Improve Availability of Disk Storage "Little Links".

Our understanding is that the DPS-8 is currently experiencing an apparent shortage of disk space. One technique commonly used to free disk space is to archive infrequently used files to tape to allow more disk space for frequently used files. The infrequently used files can be restored by the system when they are needed. Our understanding is that archiving is not currently done for the DPS-8 system.

According to Honeywell, the statistics necessary to identify infrequently used files are already captured by the DPS-8 system but the software to extract the data from these system files must be written. Honeywell provides a product, the Disk I/O Performance Analyzer (DIOPA), which provides disk utilization statistics to help distribute frequently used files among the disk drives to assist in disk drive management usage.

Discussions with Honeywell indicate the DIOPA product could be acquired as systems software under the existing Honeywell contract. It is available under GCOS III and GCOS 8. Although Honeywell did not provide precise memory requirements for DIOPA, some CPU memory and processing power is required to execute DIOPA which other software would normally use. This may impact overall system performance when the DPS-8 is heavily loaded. Current workload data is inadequate to assess the extent of this impact.

6.2.1.2 Provide End-user Tools.

To reduce demands on their ADP systems staff, many organizations provide ADP users with software tools which are easy to use and can satisfy simple needs without extensive design or coding. BLM field staff currently use ASPEN/2 in such a manner, although it does not appear to be very easy to use and, according to Honeywell technical staff, it does not use system resources very efficiently.

Honeywell supplies some end-user tools which BLM could use, such as MAGNA 8 (a fourth generation language) and the Personal Data Query facility (this product reports on existing files as if they were relational databases),

but they generally require the GCOS 8 operating system. Also, these products tend to use more system resources than other software. BLM would need to examine CPU utilization to determine if adequate capacity is available to accommodate these packages.

6.2.1.3 Collect Hardware Workload Measurements.

BLM already has software products installed which can collect information on hardware utilization, such as SARAH on the DPS-8 and CPE on the Level 6s. In order to support effective short term planning and to develop an accurate baseline for the subsequent stages of the Modernization Project, this workload data should be collected over an extended period of time to establish system usage patterns. Other Honeywell hardware workload analysis tools are listed in Appendix B.

Unfortunately, the Honeywell Level 6s and many of the other BLM computers tend to represent the smaller end of the manufacturers' product line and so less system measurement/optimizing software is available.

6.2.2 Telecommunications

Although detailed statistics are not yet available, the current BLM telecommunications network does not appear to heavily loaded. The short term opportunities for the network are to improve its usability so that it better meets the users' functional requirements and to collect additional statistics on communications workload. Specifically:

- **Improve telecommunications reliability.**
- **Improve ease-of-use for the network.**
- **Collect telecommunications workload measurement data.**

These opportunities could be achieved by upgrading existing telecommunications software and network processors or using a Value Added Network such as TELENET or GEONET.

6.2.2.1 Improve Telecommunication Line Reliability.

The current BLM telecommunications network has many single points of failure. Adding redundant paths can result in major improvements in reliability. Redundant paths can be provided by a VAN service such as GEONET or by BLM.

If BLM wishes to add redundant paths to the current network, the telecommunications software on the Level 6s must support "pass through" capability to allow a user on one Level 6 to "pass through" another State Office's Level 6 when the line to DSC has been disrupted. The current software on the Level 6s, (RNP) does not support this. DSA-6, which replaces RNP, does support pass through. DSA-6 requires matching DSA software on the DPS-8 and would also require upgrading the current FNPs for Datanet 8 network processors in DSC. DSA also supports X.25 so a VAN with X.25 could be used instead of the private BLM network.

A cost benefit analysis is required to identify the best approach. Traffic volume is a major component of VAN charges so traffic measurement and projection is critical to assessing feasibility.

6.2.2.2 Improve Ease-of-use For Current Telecommunications.

To use the current system, most users must establish multiple links between the RA and DSC. If the users were able to simply specify the destination required and let the network do the rest, they would find the network significantly easier to use. According to Honeywell, their upgraded network product, DSA, provides this capability. It also provides automatic rerouting capability. If one line is disrupted the network will automatically try another route to the same destination.

As mentioned earlier, this requires replacement of RNP and GRTS II in the State Offices and DSC respectively and the FNP hardware in DSC. The DSA 6 software requires more space than GRTS II and RNP. Some States may have to further analyze their current software base and CPU utilization to assess if DSA 6 is feasible on their Level 6.

6.2.2.3 Collect Telecommunications Workload Measurements.

Using the software available on the DPS-8 and the Level 6's to collect telecommunications traffic data over an extended period will aid in both short term operational planning as well as in long range planning, i.e., the Modernization Project.

Appendix A

Current Applications Supporting BLM's Functions

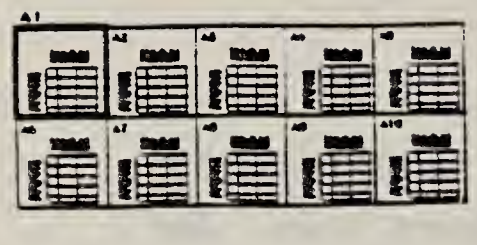
This appendix contains a set of matricies which indicate which BLM functions (as identified in Task 1 - the Functional Requirements Analysis) are supported by existing applications.

Figures A-1 through A-10 are part of a single chart which shows BLM functions by program areas, matched to applications which support them. The chart has been divided into pages, as shown by the icon in the upper left hand corner of each page. The part of the chart which that page represents is outlined to show its position in relation to the rest of the chart. The applications are categorized as follows:

- applications which run on DPS-8/70 and which are supported by DSC,
- applications which run on the DPS-8/70 but are not supported by DSC,
- applications running on the Level 6s,
- applications running on Data General equipment,
- applications running on microcomputers, and
- applications running on outside systems.

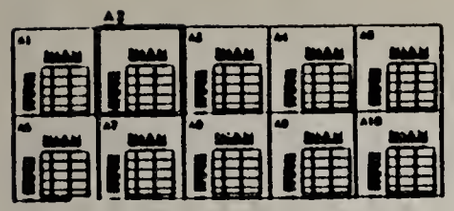
The 92 applications listed in this appendix do not represent the entire inventory of BLM applications; they are comprised of a list of DPS-8/70 applications provided by DSC, to which applications which run on other hardware have been added.

A-1 BLM's Current Applications - E&M and L&RR - DSC Supported Applications



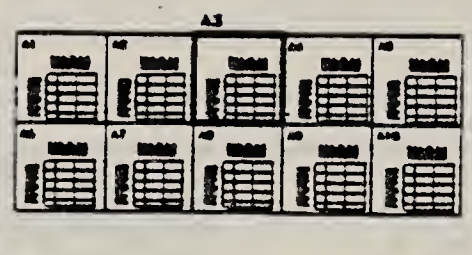
BPS-8 Applications	Adopt-A-Horse System (HB)	Aging of Accts Receivable (FA)	Auto Coal Lease Data Sys (ACLDS)*	Auto Fed & Indian Leasable Min Sys (AFILMS)*	Auto Mgmt by Objectives Sys (MBO)	Budget Matrix (BM)	Cadastral Survey Field Note Sys (CS)	Chargeback (FH)	Checks to Treasury (FC)	Corridor Environ Impact State Prog (EI)*	Data Element Dictionary Sys (DD)*	Deposits-in-Transit (FD)	Digital Elevation Model Sys (DEM)*	Eastern States Minerals (ESM)*	Eastern States Office Patent Index (ESOPI)	Ecological Site Inventory (ES)	Emergency Fire Fighters (EB)*	Financial Mgmt Edits (FE)	Financial Mgmt Reports (FR)	Financial Mgmt Yr-End Proc Sys (FY)	Fire Cost Reports (FF)	Forest Models (FM)
Energy and Minerals Functions																						
Competitive Oil and Gas Leasing																						
Over-the-Counter Oil and Gas Leasing																						
Simultaneous Oil and Gas Leasing																						
Maintain Oil and Gas Lease Files																						
Identify and Investigate Drainage Situations																						
Identify and Delineate Known Geological Structures (KGSs)																						
Process Unit and Other Agreement Applications																						
Oil and Gas Inspection and Enforcement																						
Regional Activity Planning for Coal Leasing																						
Coal Leasing																						
Preference Right Leases for Non-Energy Minerals																						
Competitive Leasing for Non-Energy Leasable Minerals, Tar Sands, and Oil Shale																						
Maintain Solid Minerals Lease and Mine Files																						
Solid Leasable Minerals Regulatory Requirements																						
Solid Leasable Minerals Inspection and Enforcement																						
Mining Claims																						
Salable Minerals																						
Adjudicate Energy and Mineral Leases																						
Administer Waste Management Service																						
Support BLM Resource Management Planning																						
Coordinate with Minerals Management Service																						
Provide Policy, Procedures, and Overall Program Management for Energy and Mineral Resources Functions																						
Lands and Renewable Resources Functions																						
Track R&D Projects																						
Planning Guidance																						
Land Management Oversight																						
Land Records Maintenance																						
Process Land Cases																						
Planning																						
Grazing Permit and Billing																						
Rangeland Monitoring																						
Public Land Improvement																						
Inventory																						
Forest Appraisal																						
Timber Sales																						
Wild Horses and Burros																						
Wildlife Habitat Protection																						
Recreation Management																						
Cultural Resource Management																						
Research and Studies																						

A-2 BLM's Current Applications - E&M and L&RR - DSC Supported Applications



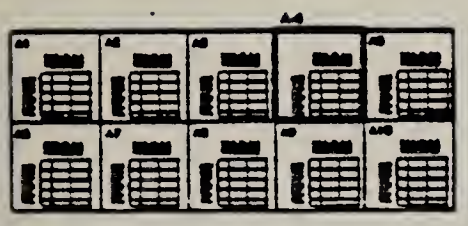
BLM Applications	Forest Utility Programs (FU)	General Ledger Sys (FG)	General Entry Trans Processor Sys (GETP)*	Health Risk Appraisal Prog (HR)*	Imprest Fund (FI)	Job Documentation Reporting (JD)	Lands & Min Case Recordation Sys (LMCRS)	Lease Management (LM)*	Material Sales (MS)	Minerals Sys 1 (MS-1)	Mining Claims (MCR)	Motor Vehicle Sys (MV)	Operating Budget (OB)	Payroll Costs (PB)	Payroll/Personnel (PB/MP)	Perpetual Inventory (PP)	Procurement Planning & Tracking Sys (PR)	Program Management (PG)*	Property Management	Public Domain Forest Inventory Sys (PD)	Range Management Automated Sys (RM)	Reimbursable Billing (PJ)	SAGEBRUSH - Rangeland Invest Anal Model (S*	Simultaneous Oil & Gas (SIMO)	Special Projects (PD)*	Summer Hire Sys (SH)	Suspense, Suspentary Clear & Unearned Accts (FS	Travel Advance Sys (FT)	USFS Forest Inventory Sys (FF)	Wildlife Information Sys (WL)	Wildfire Reporting Sys (FDB-AFFIRMS)
Energy and Minerals Functions																															
Competitive Oil and Gas Leasing																									●						
Over-the-Counter Oil and Gas Leasing																															
Simultaneous Oil and Gas Leasing																															
Maintain Oil and Gas Lease Files																															
Identify and Investigate Drainage Situations																															
Identify and Delineate Known Geological Structures (KGSs)																															
Process Unit and Other Agreement Applications																															
Oil and Gas Inspection and Enforcement																															
Regional Activity Planning for Coal Leasing																															
Coal Leasing																															
Preference Right Leases for Non-Energy Minerals																															
Competitive Leasing for Non-Energy Leasable Minerals, Tar Sands, and Oil Shale																															
Maintain Solid Minerals Lease and Mine Files																															
Solid Leasable Minerals Regulatory Requirements																															
Solid Leasable Minerals Inspection and Enforcement																															
Mining Claims																															
Salable Minerals																															
Adjudicate Energy and Mineral Leases																															
Administer Waste Management Service																															
Support BLM Resource Management Planning																															
Coordinate with Minerals Management Service																															
Provide Policy, Procedures, and Overall Program Management for Energy and Mineral Resources Functions																															
Lands and Renewable Resources Functions																															
Track R&D Projects																															
Planning Guidance																															
Land Management Oversight																															
Land Records Maintenance																															
Process Land Cases																															
Planning																															
Grazing Permit and Billing																															
Rangeland Monitoring																															
Public Land Improvement																															
Inventory																															
Forest Appraisal																															
Timber Sales																															
Wild Horses and Burros																															
Wildlife Habitat Protection																															
Recreation Management																															
Cultural Resource Management																															
Research and Studies																															

A-3 BLM's Current Applications - E&M and L&RR - on DPS-8 but not DSC Supported Applications



DPS-8/70 Applications	Solid Lease Minerals Sys (SLMS)	Vegetable & Mineral ADP Resource Sys	Track R + D Projects	Integrated Habitat Inv. Class. Sys. (IHICS)	Riparian Aquatic Inv. Data Storage (RAIDS)	Archeology & Paleontology DB	Soil & Vegetable Inv. (SVIM)	Inventory Data System (IDS)	Archeological Aspen Files	Safety - Utah & Oregon	BF-82 Tracking	Phoenix Training Catalogue	State Office Training Catalogue	State Office Training Tracking Sys.	Directors Digest Bulletin Sys.	Library Reference System
Energy and Minerals Functions																
Competitive Oil and Gas Leasing																
Over-the-Counter Oil and Gas Leasing																
Simultaneous Oil and Gas Leasing																
Maintain Oil and Gas Lease Files																
Identify and Investigate Drainage Situations																
Identify and Delineate Known Geological Structures (KGSs)																
Process Unit and Other Agreement Applications																
Oil and Gas Inspection and Enforcement																
Regional Activity Planning for Coal Leasing																
Coal Leasing																
Preference Right Leases for Non-Energy Minerals																
Competitive Leasing for Non-Energy Leasable Minerals, Tar Sands, and Oil Shale																
Maintain Solid Minerals Lease and Mine Files																
Solid Leasable Minerals Regulatory Requirements																
Solid Leasable Minerals Inspection and Enforcement																
Mining Claims																
Salable Minerals																
Adjudicate Energy and Mineral Leases																
Administer Waste Management Service																
Support BLM Resource Management Planning																
Coordinate with Mineral Management Services																
Provide Policy, Procedures, and Overall Program Management for Energy and Mineral Resources Functions																
Lands and Renewable Resources Functions																
Track A&D Projects																
Planning Guidance																
Land Management Oversight																
Land Records Maintenance																
Process Land Cases																
Planning																
Grazing Permit and Billing																
Rangeland Monitoring																
Public Land Improvement																
Inventory																
Forest Appraisal																
Timber Sales																
Wild Horses and Burros																
Wildlife Habitat Protection																
Recreation Management																
Cultural Resource Management																
Research and Studies																

A-4 BLM's Current Applications - E&M and L&RR - on Level 6 PCs and Data Generals



Energy and Minerals Functions

- Competitive Oil and Gas Leasing
- Over-the-Counter Oil and Gas Leasing
- Simultaneous Oil and Gas Leasing
- Maintain Oil and Gas Lease Files
- Identify and Investigate Drainage Situations
- Identify and Delineate Known Geological Structures (KGSs)
- Process Unit and Other Agreement Applications
- Oil and Gas Inspection and Enforcement
- Regional Activity Planning for Coal Leasing
- Coal Leasing
- Preference Right Leases for Non-Energy Minerals
- Competitive Leasing for Non-Energy Leasable Minerals, Tar Sands, and Oil Shale
- Maintain Solid Minerals Lease and Mine Files
- Solid Leasable Minerals Regulatory Requirements
- Solid Leasable Minerals Inspection and Enforcement
- Mining Claims
- Salable Minerals
- Adjudicate Energy and Mineral Leases
- Administer Waste Management Service
- Support BLM Resource Management Planning
- Coordinate with Mineral Management Services
- Provide Policy, Procedures, and Overall Program Management for Energy and Mineral Resource Functions

Lands and Renewable Resources Functions

- Track RMP Projects
- Planning Guidance
- Land Management Oversight
- Land Records Maintenance
- Process Land Cases
- Planning
- Grazing Permit and Billing
- Rangeland Monitoring
- Public Land Improvement
- Inventory
- Forest Appraisal
- Timber Sales
- Wild Horses and Burros
- Wildlife Habitat Protection
- Recreation Management
- Cultural Resource Management
- Research and Studies

Level 6 Applications

- OMCA
- PO Tracking
- Correspondence Tracking
- Manpower Correlation System
- Law Enforcement Auto Detection (Leads)

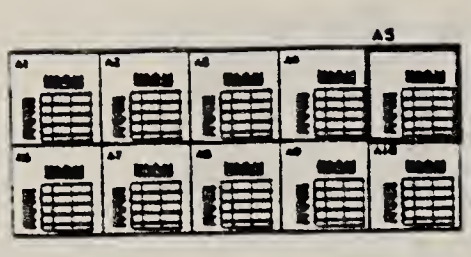
Data General Applications

- BIS (Mass + Idams)
- IAMS - (ALDS, AAAS, FUELS) - BIFC

Personal Computers (Macs, IBM, Etc.) Applicat

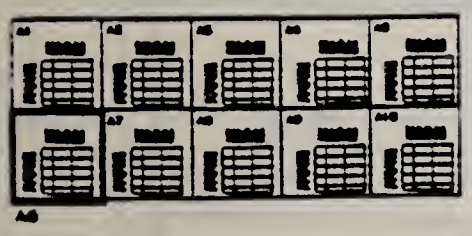
- Misc. PC Data Bases
- Vacancy List
- Table of Organization
- Procurement Info Track Sys (Files)

A-5 BLM's Current Applications - E&M and L&RR - on Outside Systems



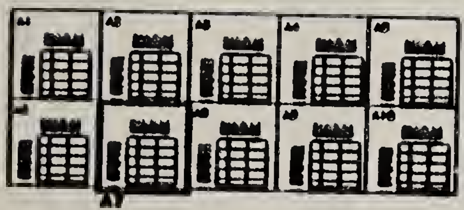
Energy and Minerals Functions	PAAS - MDS/Vax	AFS - MDS/Vax	F & WI Serv. Wildlife Bulletin Board	Storetle (EPA DB)	Stored Forest Inventory	FSH - View It-Forest Inv. (F.S., Ft. Collins)	Natural Heritage Plan DB (Nature Conserv. Gp. Co.)	Western Oregon Timber Sales Sys. (IBM-DP	Forest Road System (FS at Fort Collins)	Modeling for Socio/Demographics	On Line Computer Library Center	Mac4 & Mac5 (FS-Hydrology)	Dam Safety (Reclamation)	Oakare (FS)	Affirms - (FS)	OAS Reporting - (Reclamation)	Gam-1	Petroleum Institute (PI)	Unknown Hardware Applications	Land Sat. Inv. Detect. (L105)
Competitive Oil and Gas Leasing																	●	●		
Over-the-Counter Oil and Gas Leasing																	●	●		
Simultaneous Oil and Gas Leasing																				
Maintain Oil and Gas Lease Files																				
Identify and Investigate Drainage Situations																				
Identify and Delineate Known Geological Structures (KGSs)																				
Process Unit and Other Agreement Applications																				
Oil and Gas Inspection and Enforcement																				
Regional Activity Planning for Coal Leasing																				
Coal Leasing																				
Preference Right Leases for Non-Energy Minerals																				
Competitive Leasing for Non-Energy Leasable Minerals, Tar Sands, and Oil Shale																				
Maintain Solid Minerals Lease and Mine Files																				
Solid Leasable Minerals Regulatory Requirements																				
Solid Leasable Minerals Inspection and Enforcement																				
Mining Claims																				
Salable Minerals																				
Adjudicate Energy and Mineral Leases																				
Administer Waste Management Service																				
Support BLM Resource Management Planning																				
Coordinate with Mineral Management Services	●	●																		
Provide Policy, Procedures, and Overall Program Management for Energy and Mineral Resources Functions																				
Lands and Renewable Resources Functions																				
Track NEB Projects																				
Planning Guidance																				
Land Management Oversight																				
Land Records Maintenance																				
Process Land Cases																				
Planning																				
Grazing Permit and Billing																				
Rangeland Monitoring																				
Public Land Improvement																				
Inventory			●	●	●	●	●	●												
Forest Appraisal			●																	
Timber Sales			●					●	●											
Wild Horses and Burros																				
Wildlife Habitat Protection			●																	
Recreation Management																				
Cultural Resource Management																				
Research and Studies									●											

A-6 BLM's Current Applications - MS and Bureau-wide - DSC Supported Applications



Management Services Functions	Adopt-A-Horse System (AH)	Aging of Accts Receivable (FA)	Auto Coal Lease Data Sys (ACLDS)*	Auto Fed & Indian Leasable Min Sys (AFILMS)*	Auto Mgmt by Objectives Sys (MBO)	Budget Matrix (BM)	Cadastral Survey Field Note Sys (CS)	Chargeback (FH)	Checks to Treasury (FC)	Corridor Environ Impact State Prog (EI)*	Data Element Dictionary Sys (DD)*	Deposits-in-Transit (FD)	Digital Elevation Model Sys (DEM)*	Eastern States Minerals (ESM)*	Eastern States Office Patent Index (ESOPI)	Ecological Site Inventory (ES)	Emergency Fire Fighters (EB)*	Financial Mgmt Edits (FE)	Financial Mgmt Reports (FR)	Financial Mgmt Tr-End Proc Sys (FI)	Fire Cost Reports (FF)	Forest Models (FM)
Safety Inspection and Reporting																						
Personnel and Payroll Management																						
Position Management																						
Training																						
Contract Preparation and Control																						
Fleet, Personal Property, Real Property, and Facility Inventory Management																						
Information Systems Management																						
Telecommunications and Technology Management																						
Records Management																						
Organizational Analysis and Reform MB Reporting																						
Program Evaluation																						
Financial Handling of Accounts, Collections, and Billings																						
Financial Reporting																						
Incident Investigation and Reporting																						
Plan and Conduct Cadastral Surveys for Original Survey and Title Defense																						
Maintain Cadastral Survey Field Notes																						
Track Cadastral Surveys for Outside Agencies																						
Cartographic Services and Geographic Information Systems																						
Facility Construction and Maintenance																						
Transportation System Construction and Maintenance																						
Prevent, Predict, and Fight Wildfire																						
Coordinate Aviation Requirements																						
Equal Employment Opportunity Compliance Reporting																						
Equal Employment Opportunity Conflict Resolution																						
Budget Development																						
Budget Operations																						
External Liaison Queries																						
External Liaison Document/Material Preparation																						
Bureau Wide Functions																						
Public Land Statistics																						
Data Entry																						
Technology Coordination																						
ADP Training																						
Management Ad Hoc Query																						
Legal Land Coordinates																						

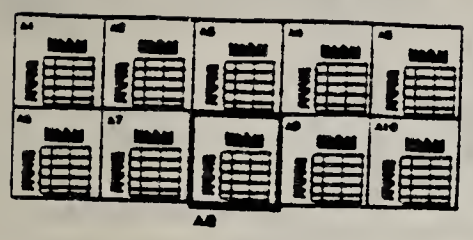
A-7 BLM's Current Applications - MS and Bureau-wide - DSC Supported Applications



MPS-B/ZS Applications

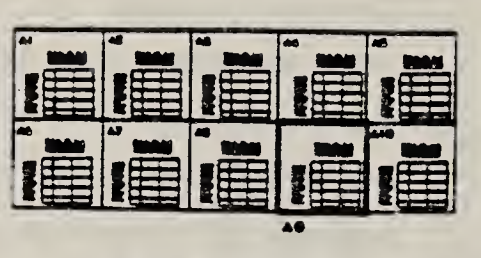
Management Services Functions	Forest Utility Programs (FU)	General Ledger Sys (FG)	General Entry Trans Processor Sys (GETP)*	Health Risk Appraisal Prog (HR)*	Imprest Fund (FI)	Job Documentation Reporting (JD)	Lands & Min Case Recordation Sys (LMCRS)	Lease Management (LM)*	Material Sales (MS)	Minerals Sys 1 (MS-1)	Mining Claims (MCR)	Motor Vehicle Sys (MV)	Operating Budget (OB)	Payroll Costs (PB)	Payroll/Personnel (PB/MP)	Perpetual Inventory (FP)	Procurement Planning & Tracking Sys (PR)	Program Management (PG)*	Property Management	Public Domain Forest Inventory Sys (PD)	Range Management Automated Sys (RM)	Reimbursable Billing (FJ)	SAGEBRUSH - Rangeland Invest Anal Model (SR)	Simultaneous Oil & Gas (SIMO)	Special Projects (PD)*	Summer Hire Sys (SH)	Suspense, Budgetary Clear & Unearned Accts (F	Travel Advance Sys (FT)	USFS Forest Inventory Sys (PF)	Wildlife Information Sys (WL)	Wildfire Reporting Sys (FBA-AFFIRMS)
Safety Inspection and Reporting																															
Personnel and Payroll Management															●											●					
Position Management															●																
Training																															
Contract Preparation and Control																	●														
Fleet, Personal Property, Real Property, and Facility Inventory Management												●							●												
Information Systems Management																															
Telecommunications and Technology Management																															
Records Management																															
Organizational Analysis and Reform 88 Reporting													●	●	●																
Program Evaluation																															
Financial Handling of Accounts, Collections, and Billings		●			●							●	●	●		●						●					●	●			
Financial Reporting																															
Incident Investigation and Reporting																															
Plan and Conduct Cadastral Surveys for Original Survey and Title Defense																															
Maintain Cadastral Survey Field Notes																															
Track Cadastral Surveys for Outside Agencies																															
Cartographic Services and Geographic Information Systems																															
Facility Construction and Maintenance						●																									
Transportation System Construction and Maintenance						●																									
Prevent, Predict, and Fight Wildfire																															●
Coordinate Aviation Requirements																															
Equal Employment Opportunity Compliance Reporting															●																
Equal Employment Opportunity Conflict Resolution															●																
Budget Development													●																		
Budget Operations																															
External Liaison Queries																															
External Liaison Document/Material Preparation																															
Bureau Wide Functions																															
Public Land Statistics																															
Data Entry																															
Technology Coordination																															
ADP Training																															
Management Ad Hoc Query																															
Legal L[illegible]dinates							●																								

A-8 BLM's Current Applications - MS and Bureau-wide - on DPS-8 no but not Supported Applications



Management Services Functions	DPS-8/70 Applications														
	Solid Lease Minerals Sys (SLMS)	Vegetable & Mineral ADP Resource Sys	Track A + B Projects	Integrated Habitat Inv. Class. Sys. (INICS)	Riparian Aquatic Inv. Data Storage (RAIDS)	Archeology & Paleontology DB	Soil & Vegetable Inv. (SVIM)	Inventory Data System (IDS)	Archeological Aspen Files	Safety - Utah & Oregon	SF-82 Tracking	Phoenix Training Catalogue	State Office Training Catalogue	State Office Training Tracking Sys.	Directors Digest Bulletin Sys.	Library Reference System
Safety Inspection and Reporting										●						
Personnel and Payroll Management											●					
Position Management											●					
Training												●	●			
Contract Preparation and Control																
Fleet, Personal Property, Real Property, and Facility Inventory Management															●	
Information Systems Management																
Telecommunications and Technology Management																●
Records Management																
Organizational Analysis and Reform & Reporting																
Program Evaluation																
Financial Handling of Accounts, Collections, and Billings																
Financial Reporting																
Incident Investigation and Reporting																
Plan and Conduct Cadastral Surveys for Original Survey and Title Defense																
Maintain Cadastral Survey Field Notes																
Track Cadastral Surveys for Outside Agencies																
Cartographic Services and Geographic Information Systems																
Facility Construction and Maintenance																
Transportation System Construction and Maintenance																
Prevent, Predict, and Fight Wildfire																
Coordinate Aviation Requirements																
Equal Employment Opportunity Compliance Reporting																
Equal Employment Opportunity Conflict Resolution																
Budget Development																
Budget Operations																
External Liaison Queries																
External Liaison Document/Material Preparation																
BLM-wide Functions																
Public Land Statistics																
Data Entry																
Technology Coordination																
ADP Training																
Management Ad Hoc Query																
Legal Land Coordinates																

A-9 BLM's Current Applications - MS and Bureau-wide - on Level 6, PCs and Data Generals

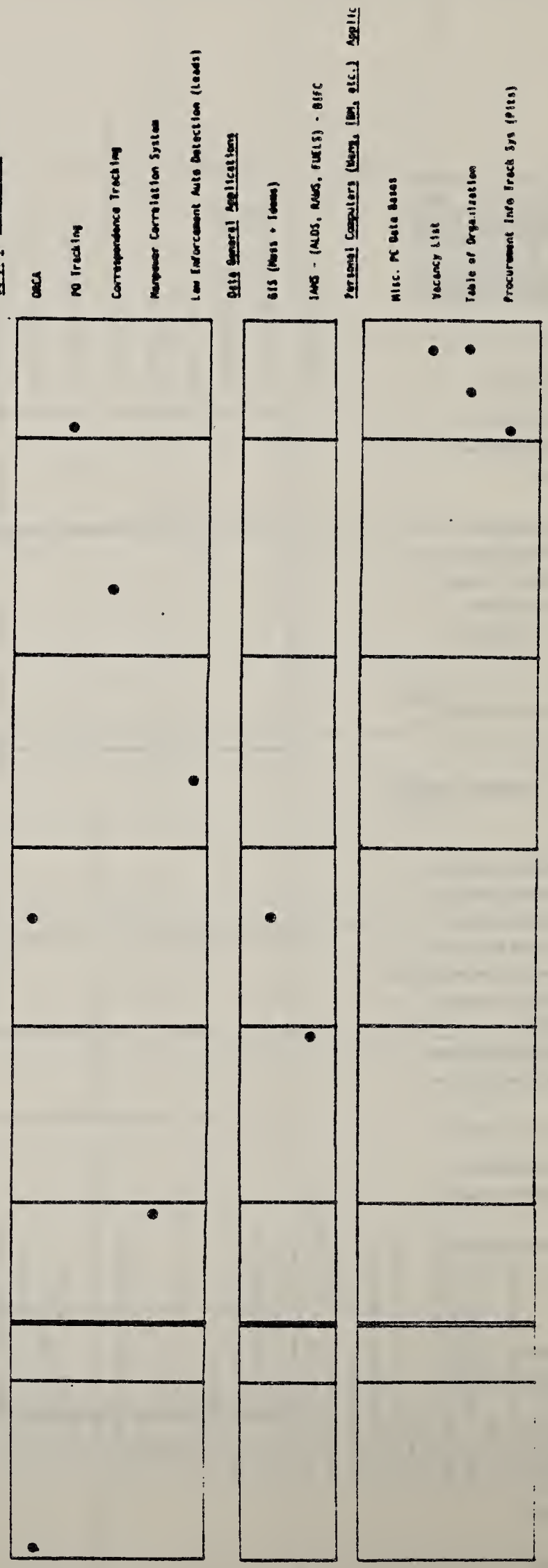


Management Services Functions

- Safety Inspection and Reporting
- Personnel and Payroll Management
- Position Management
- Training
- Contract Preparation and Control
- Fleet, Personal Property, Real Property, and Facility Inventory Management
- Information Systems Management
- Telecommunications and Technology Management
- Records Management
- Organizational Analysis and Reform 88 Reporting
- Program Evaluation
- Financial Handling of Accounts, Collections, and Billings
- Financial Reporting
- Incident Investigation and Reporting
- Plan and Conduct Cadastral Surveys for Original Survey and Title Defense
- Maintain Cadastral Survey Field Notes
- Track Cadastral Surveys for Outside Agencies
- Cartographic Services and Geographic Information Systems
- Facility Construction and Maintenance
- Transportation System Construction and Maintenance
- Prevent, Predict, and Fight Wildfire
- Coordinate Aviation Requirements
- Equal Employment Opportunity Compliance Reporting
- Equal Employment Opportunity Conflict Resolution
- Budget Development
- Budget Operations
- External Liaison Queries
- External Liaison Document/Material Preparation

BLM-wide Functions

- Public Land Statistics
- Data Entry
- Technology Coordination
- ADP Training
- Management Ad Hoc Query
- Legal Land Coordinates



A-10 BLM's Current Applications - MS and Bureau-wide - on Outside Systems

Management Services Functions	PAAS - MAS/Mas	AFS - MAS/Mas	F & WS Serv. Wildlife Bulletin Board	Sterotio (EPA RD)	Storms Forest Inventory	PSW - View It-Forest Inv. (F.S., Ft. Collins)	Natural Heritage Plan RD (Nature Conserv. Of. Co.)	Western Oregon Timber Sales Sys. IBM-AP	Forest Road System (FS at Fort Collins)	Modeling for Socio/Demographics	On Line Computer Library Center	Hoc8 & Hoc8 (FS-Hydrology)	Dam Safety (Reclamation)	Bobave (FS)	Affirms - (FS)	OAS Reporting - (Reclamation)	Petroleum Institute (PI)	Gen-I	Unknown Hardware Applications	Land Sat. Inv. Detect. (LIDS)
Safety Inspection and Reporting																			
Personnel and Payroll Management																			
Position Management																			
Training																			
Contract Preparation and Control																			
Fleet, Personal Property, Real Property, and Facility Inventory Management											●								
Information Systems Management																			
Telecommunications and Technology Management																			
Records Management																			
Organizational Analysis and Reform MB Reporting																			
Program Evaluation																			
Financial Handling of Accounts, Collections, and Billings																			
Financial Reporting																			
Incident Investigation and Reporting																			●
Plan and Conduct Cadastral Surveys for Original Survey and Title Defense																			
Maintain Cadastral Survey Field Notes																			
Track Cadastral Surveys for Outside Agencies																			
Cartographic Services and Geographic Information Systems																			
Facility Construction and Maintenance											● ●								
Transportation System Construction and Maintenance							●												
Prevent, Predict, and Fight Wildfire												● ●							
Coordinate Aviation Requirements															●				
Equal Employment Opportunity Compliance Reporting																			
Equal Employment Opportunity Conflict Resolution																			
Budget Development																			
Budget Operations																			
External Liaison Queries																			
External Liaison Document/Material Preparation																			
BLM-wide Functions																			
Public Land Statistics																			
Data Entry																			
Technology Coordination																			
ADP Training																			
Management Ad Hoc Query																			
Legal Land Coordinates																			

Appendix B

Representative Honeywell Software Products

This appendix contains a list of Honeywell software products available for the DPS 8/70 and the Level 6. These software products are representative of the type of software which could be added to the current BLM Honeywell computers in order to provide additional capabilities. The products are categorized into three groups: end user tools, programmer productivity tools, and systems measurement packages. In addition to a brief description of each product's features, this appendix lists other systems software required to operate the product, the operating system needed (GCOS III or GCOS 8), and whether the product is available from the GSA schedule.

The product information used in these illustrations has been provided by Honeywell. No attempt has been made to verify the features claimed for the product or to determine how effective these features are. When considering any of these products, BLM should verify the features and determine resource requirements. Also, we did not conduct a search for third-party software packages so additional options may be available.

Appendix B
Representative Honeywell Software Products

Product	Type	Key Features	Other System Requirements	GCOS III Available	GCOS III GSA	GCOS 8 Available	GCOS 8 GSA
End User Tool							
Example Query (a Personal Data Query product)	Table, query	o Tabular screen environment o English syntax o Multi table I/O o Freedom in query construction sequence o Security o Transparency of data access		No	-	Yes	Yes
Personal Computing Facility (PFC)	Screen-oriented interactive system	o Forms construction and use o Form oriented applications o Scrolling o Split screen o Search and retrieval o Automatic forms library o Field editing and formatting o Import/export for GCOS files o Programming language and Data Management interface o Numeric of 10^{127} - 10^{128} o Interface with PDQ o Forms chaining o Audit trail for file access o On-line help	TSS	Yes	Yes	Yes	Yes
Transaction Screen Management System	Screen formator/developer for DM-IV transaction processing environment	o Security control o Menu-driven/formatted screens o Interactive and batch utilities o Field editing/range checking o Variable message generation o Multi language menu and forms support	DM-IV/TP at least one VIP7800 for initializing TSM system VIP7700 or 7800 or emulation 15K links for system disk files 192K online words memory	Yes	Yes	Yes	Yes

Appendix B
Representative Honeywell Software Products

Product	Type	Key Features	Other System Requirements	GCOS III Available	GCOS III GSA	GCOS 8 Available	GCOS 8 GSA
Magna 8	4GL, and COBOL generator	o Interactive editing o Built in defaults and functions o Computational capabilities o Sort, merge, convert o On-line HELP	TSS TSS COBOL 74 Option COBOL 74	No	-	Yes	Yes
PDQ	Query, using relational format (set of products)	o Transparent file access o Tabular format o Report format options o Scrolling o English syntax o Interaction with COBOL-74 programs o Security		No	-	Yes	Yes

Appendix B
Representative Honeywell Software Products

Product	Type	Key Features	Other System Requirements	GCOS III Available	GCOS III GSA	GCOS 8 Available	GCOS 8 GSA
Programmer Productivity							
SOFTOOL (3rd Party)	Application development tool (COBOL 74)	o On-line tutorials o Help o Separate development/executable environments o Simple user interface o Saves all versions o Detection/correction feature	GRTS11 or NPS DNS FORTRAN Run-Time TSS Facility	Yes	Yes	Yes	Yes
System-80 (Third Party)	COBOL 74 program generator	o Generates COBOL code o Modification through program regeneration o Portability	VIP7700 or 7800 or emulation COBOL 74 compiler & Runtime TSS TSS File Mgmt Option TSS Adv Applic Support	Yes	Yes	Yes	Yes
Syntax-Directed Editor	COBOL generator	o Full screen editor o On-line HELP o Fill-in-blanks screens o Automatic syntax check o Data Dictionary access	COBOL compiler	No	-	Yes	Yes
PROIV	Application generator	o Fill in the blanks screens o Horizontal transportation o On-line HELP o Documentation generator o Security o Transparent data linkage		GCOS 6	Yes	Yes	Yes

Appendix B
Representative Honeywell Software Products

Product	Type	Key Features	Other System Requirements	GCOS III Available	GCOS III GSA	GCOS 8 Available	GCOS 8 GSA
System Measurement							
Disk I/O Performance Analyzer	Disk performance & efficiency	o Runs simultaneous to normal operations o On-line or batch analysis	TSS	Yes	Yes	Yes	Yes
Performance Analysis Reporting System	System optimizer for resource usage	o Modular design o User controlled parameters o Bar graphs		Yes	Yes	Yes	Yes
Systems Performance Analysis Facility	Monitor, record, and analyze system usage	o Displays up to 30 user codes o Bar graph charts o User controlled parameters		Yes	Yes	Yes	Yes

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